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The University of Toronto Medical Journal

(AN UNDERGRADUATE PUBLICATION)

This journal is published six times a year, November to April, by the Medical Society of the University of Toronto, to serve as a medium for student expression and to bring to the student recent articles of scientific interest.

\$1.50 per volume. 25c. per single copy.

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Editorial

Welcome 4T6

Running close to form, the first issue of the *Students' Medical Journal* welcomes the new class in Medicine. You have a hard row to hoe, but nothing is as hard as it's supposed to be, and you will find that there is nothing in the medical curriculum that cannot be hurdled with a little effort.

Doubtless you have read stories and listened to tales of burning the midnight oil for four and five hours on a stretch, and keeping this up indefinitely. This is far, far from the truth; none of your teachers expect such studiousness. Advice is easy to give but hard to take, and we have a few qualms in giving any. The top men in each class are often neither the most intelligent nor the hardest workers; most of them do, however, keep up with the work from day to day. Read over your lecture notes each night. In this way you get exposed to the same material twice in twenty-four hours, and even if you do not consolidate it, still it is in a malleable formation for quick assimilation when the time comes. Ten to twelve hours a week should be ample time at the books, if one does this conscientiously. Your teachers are surprisingly human and will meet you more than half way—they are more interested in what you learn than in what you don't learn, contrary to popular conception, and are not out, in the vernacular, to "pluck" you. There is no set number of students to be failed each year, so stop looking for the ten, fifteen, twenty or more who are "dumber" than you are.

You are sure to find certain subjects in your course very uninteresting, perhaps because you feel they are of no practical importance. Don't despair! Your teachers and all of us have quibbled in our turn and then wished we had a deeper and clearer knowledge of the fundamentals. In this present scientific day and age, medicine must be scientific, and we must at least be on speaking terms with those "princes" of science, physicists, chemists and engineers.

A Plea for Outside Reading

In six years' time most of you will graduate with the degree M.D. With this degree, plus a fee or two, you are entitled by law to practise medicine and, indeed, after a good internship, you are perfectly capable of doing this. However, if you learn nothing more than Medicine in College, these six years are no more to you than a specialized "hole" in your life; if you are perfectly equipped in dealing with disease, you are poorly equipped in dealing with people. Truly, learning the rudiments of medicine is our main job at college, but in our spare time we should try to learn the rudiments of living and acquire an insight into the other person's point of view.

There is a lot of good fellowship in medical school that smooths out many rough edges. Outside reading is a useful and necessary adjunct to this. The Hart House Library is a place where almost any taste for reading, no matter how catholic, may be satisfied. One does not have to be a bookworm to like and appreciate good books. If you have no time for reading now, you are certainly going to have less when you graduate.

Someone may point out to you that such and such a person, though a great lover of books, is a failure in Medicine. As Osler himself says: "It is not because they knew books more, but because they knew men less."

Congratulations to our Dean, Dr. W. E. Gallie, who has recently been made President-elect of the American College of Surgeons at the annual meeting of the College in Chicago. This is one of the highest honours ever paid to a Canadian surgeon.

OBITUARY

To all graduates of the Faculty of Medicine, University of Toronto, of the past thirty years, and to many of the present undergraduates, John Gerald FitzGerald will be remembered as a great teacher, and as one who not only taught preventive medicine in the classroom but through the founding and developing of the Connaught Laboratories translated ideals into actual public service. To the

The establishing in 1924 of the School of Hygiene through the munificence of The Rockefeller Foundation manifested the confidence of this Foundation and of the University in his ability and judgment. As Director of the School, he organized it as an institute serving the whole of Canada, providing a broad fundamental training for those assuming responsibilities for leadership in public-



JOHN GERALD FITZGERALD, M.D., LL.D., F.R.S.C., F.R.C.P. (C)

members of the classes of '10 and '11, he will be remembered as a young enthusiastic instructor in bacteriology, and to all who graduated after his appointment in the Department of Hygiene his name will be always associated with "The Practice of Preventive Medicine". Through his textbook, bearing that title, he was known to students throughout this continent. To all he presented preventive medicine as an integral part of the practice of their profession.

health matters. In the development of this institute, Dr. FitzGerald always kept research in mind, and he evolved an inter-relationship between the School of Hygiene and the Connaught Laboratories, which has made possible many research studies which ordinarily could not have been undertaken in this School.

His conception of medical education was broad. He was vitally interested in the medical faculty and in the welfare of the student body. From 1932-1936, he

served as Dean, setting aside other responsibilities in order to fulfil his duties on behalf of the staff and students of the Faculty of Medicine. In 1936-1937, he devoted a year, on the invitation of the Division of Medical Sciences of The Rockefeller Foundation, to conducting a survey, together with Dr. C. E. Smith, of the teaching of preventive medicine to medical undergraduates in Europe and North America, and presented the findings of this survey in an important report.

His association with The Rockefeller Foundation commenced in 1923 when he was appointed a member of the International Health Board, and he served subsequently as a member of the Board of Scientific Directors of the International

Health Division of the Foundation. Another example of the international recognition which was extended to him in the field of public health was his appointment as a member of the Health Committee of the League of Nations. For several years he was a member of this Committee and he served a year as vice-president of the committee. He also served as a member of the Permanent Commission on Biological Standardization of the Health Organization of the League.

In his passing, our University has suffered a most grievous loss and the whole cause of public health in Canada and abroad has been deprived of one of its outstanding leaders.

R. D. DEFRIES.

THE USE AND ABUSE OF DAGENAN

By A. W. BAGNALL, B.A.(B.C.), M.D.

Senior Resident in Medicine, Toronto General Hospital

Dagenan is a dangerous drug. This article will deal with the excuses for its use as well as the methods to be employed. Dagenan is also known as Sulfapyridine and M. & B. 693.

The following requirements must be fulfilled before Dagenan is prescribed:

(1) A clinical diagnosis of the disease must have been established and all possible measures employed for an accurate bacteriological diagnosis. *No diagnosis—no Dagenan.*

(2) The bacteriological agent suspected or known to be present must be one that has been proved to respond favourably to the use of Dagenan.

(3) Either the disease or its complications must be serious enough to warrant the use of a possibly lethal drug.

(4) To obviate serious consequences, at least an approximate idea of renal and bone-marrow functions must have been obtained.

(5) With the hope born of desperation Dagenan may be given to critically ill cases of obscure infective origin before a diagnosis is possible. This is the rule-breaking rule.

Once a decision has been reached to give Dagenan, there are principles to be followed in its administration:

(1) In respect to their growth in a medium containing Dagenan, susceptible bacteria may be said to obey the All-or-None Law, that is, concentrations less than effective levels are of little value. Therefore it is essential to reach the optimum level as quickly as possible and maintain it as long as necessary.

(2) Because the maximum blood level after a single dose of Dagenan is reached in three to four hours and then gradually declines, the doses of Dagenan must be spaced four hours, or at the most six hours, apart, for the whole of the twenty-four hours. Bacteria are just as

active in the sleeping as in the waking body.

(3) Certain processes of selection vary the concentration of Dagenan in the different body fluids. For example, a given blood level may be adequate for pneumonia but not for pneumococcal meningitis, because the Dagenan concentration in cerebrospinal fluid is 20 per cent to 40 per cent less than that in the blood at the same instant. Conversely, a surface infection of the urinary tract needs only a fraction of the dose required for pneumonia because the tubular re-sorption of water leaves the Dagenan concentration in the urine twenty or more times that in the blood. It must be emphasized, however, that this applies only to those parts of the genito-urinary tract bathed in urine. Other parts, such as the prostate, must depend on the blood level being adequate.

(4) The dosage of Dagenan will depend not only on the site of infection, but also upon the susceptibility of the organism and its virulence—that is, the need for hasty control of the infection.

(5) Recognition must be given to individual variation in rate of absorption, conjugation and excretion of the drug. No rule can be laid down that will work in all, or even in most cases. Experience has shown that a certain dosage is usually adequate for a certain type of infection. If the treatment is not living up to expectation, then the dosage may not be adequate. The only way to be sure is to make daily estimations of the Dagenan level of the fluid in which one is most interested and regulate the dosage accordingly. In pneumonia the effective level is between 5 and 10 mgms. per 100 cc. of blood.

(6) From the moment it has been decided to give Dagenan until some time after its use has been discontinued, one must be on the alert for any one of many toxic manifestations of the drug.

(7) It must be an axiom in the use of Dagenan that all accumulations of pus be assured of early and adequate drainage by needle or knife. Even adequate concentrations of Dagenan become ineffective under these circumstances.

When to Use Dagenan

It is difficult enough in many cases to decide when to use chemotherapy. It is much more difficult to be specific as to when to use Dagenan as opposed to sulphanilamide or sulphathiazole. Dagenan is warranted in the following infections in the suggested dosage:

(1) *Hemolytic streptococcal infection*—when serious in degree or situation, in full dosage. When less serious, prontosil may be given and when merely bothersome as in the ordinary “*strep. throat*”, no chemotherapy.

(2) *Gonococcal infections*—urethritis in the male, small doses. Pelvic inflammation in the female, or gonococcal prostatitis or arthritis in the male, moderate doses. Gonococcal endocarditis or ophthalmia, full doses.

(3) *Pneumococcal infections* of all types, full doses.

(4) *B. coli infections (non-urinary)*—e.g. of peritoneum, full doses.

(5) *Staphylococcus aureus hemolyticus infections*—some response seems to be obtained from the use of full doses in cases of staphylococcal pneumonia and septicaemia, but one should not be hopeful. Sulphathiazole may be slightly more effective.

(6) *B. welchi infections*—full doses plus sprinkling of powdered Dagenan in the debrided wound.

(7) *Surface urinary tract infections*—with *B. coli*, *B. proteus*, *B. lactis aerogenes*, especially in those cases where sulphanilamide has failed, small to moderate doses. *Staphylococcus aureus hemolyticus* is particularly resistant, as are *streptococcus faecalis* and *anaerobic streptococcus*. These are said to respond much better to sulphathiazole in small to moderate dosage. If chemotherapy fails, or if there is recurrence of the infection, it must be considered that

there is a mechanical factor of obstruction which must be dealt without further ado.

(8) *Meningitis* of all types forms a special case. *Tuberculous meningitis* is still hopeless, as is *tuberculous pneumonia*. With the other bacteria, particularly *streptococci*, there is now some hope of recovery. The dosage must be even larger than pneumonia dosage and it is often necessary, as in comatose patients, to use the soluble salt parenterally. About fifty per cent of cases of *streptococcal meningitis* now recover with Dagenan, but only the very rare case of *pneumococcal meningitis* survives. *Chorion lymphocytic meningitis*, a virus disease, is said to respond very favourably to full doses.

(9) *Chronic Ulcerative Colitis*—small doses.

(10) *Acute and Chronic Brucellosis*—small doses.

Table of Dosages

Full Dose: 2 grams every four hours for the first 24 hours. 1 gram every four hours for the second 24 hours. $\frac{1}{2}$ gram every four hours for each succeeding day.

Moderate Dose: $1\frac{1}{2}$ grams every four hours for the first 24 hours. 1 gram every four hours for the second 24 hours. 1 gram every six hours for each succeeding day.

Small Dose: 1 gram every six hours daily. ($\frac{1}{2}$ gram every six hours in the case of ulcerative colitis.)

Progress of the Disease despite Dagenan may mean:

(1) The tentative diagnosis was wrong (clinical or bacteriological).

(2) An adequate concentration of Dagenan at the site of infection has not been established. A blood Dagenan level will usually give the clue. Excess fluids will wash Dagenan out.

(3) The organism is particularly virulent or had become too well established before Dagenan was started.

(4) There has been an accumulation of pus—this must be evacuated.

Progress of the disease should always precipitate an immediate clinical, bacteriological and chemical review of the case.

Toxic Effects of Dagenan

(1) *Nausea and Vomiting.* The greatest drawback to Dagenan is probably not the number of people it kills, because these are relatively few compared to the number saved, but the number of people who are made thoroughly miserable by nausea and vomiting. This most unfortunate local effect on the gastric mucosa may be minimized by giving the Dagenan as a powder with grains x of Bicarbonate of Soda in milk or fruit juice, making sure that the glass is well rinsed out. This powdering facilitates rapid absorption and so prevents some of the waste from vomiting as well. If a dose is vomited within an hour of administration, it should be repeated at once and is often retained. Paraldehyde drams 2 or 3 in ounces 4 of olive oil as retention enema will do much to relieve the gastric misery. In the worst cases, Soludagenan may be substituted. It rarely causes even nausea if diluted to 15 or 20 cc. with distilled water or normal saline and injected slowly intravenously.

(2) *Dagenan may cause fatal anuria.* This issue is heralded by oliguria or by gross hematuria or both. Microscopic hematuria is fairly common and should be taken as a warning to increase fluids. Gross hematuria or a urinary output of less than 400 c.c. daily in the presence of an intake of 1500 c.c. or more of fluids is a warning to stop the drug and push fluids. If anuria develops and does not respond to intravenous 5% glucose in distilled water and the slow injection of grains xv of Aminophyllin intravenously catheterization of the ureters or decapsulation of the kidneys, or both, should be done when the N.P.N. rises to 150 mgm. Recriminations will vary inversely as the number of urinalyses. Examination of the urine every two days is practical. Daily examination would be better.

(3) *Dagenan may cause fatal agranulocytosis.* A leukocyte count should be

done every two days in every case. If the count is normal or low to start with, or falls below 5,000 in the course of therapy, the leukocytes should be counted daily and the proportion of granulocytes estimated. When, with a leukopenia, the proportion of granulocytes falls below that of the lymphocytes, the drug should be discontinued and fluids pushed. With proper precautions, it is rarely necessary to transfuse. Occasionally transient leukemoid blood pictures are seen with chemotherapy.

(4) *In rare cases Dagenan may cause fatal hemolytic anaemia.* This is so unpredictable and so spectacular that in the average case estimations of haemoglobin are only necessary at weekly intervals. Some fall in haemoglobin is to be expected with any severe infection—only with prolonged use of Dagenan does anaemia become a major danger (apart from the rare acute hemolytic type).

(5) *Drug rash* is less common in Dagenan than in sulphathiazole and sulphanilamide therapy. It is usually maculo-papular and erythematous and tends to appear about the time one is thinking about stopping the drug anyway. It should be taken as a warning to discontinue Dagenan.

(6) *Drug fever* is also less common in Dagenan therapy. It may be highly confusing, however, in that it tends to appear at the time one is on the watch for complications of the primary disease, such as empyaema in pneumonia. If the clinical signs are diminishing while the fever is mounting, the Dagenan should be stopped and fluids pushed. If the temperature remains elevated despite this for forty-eight hours, the odds are against drug fever. Once established, Dagenan fever tends to increase gradually until eight or twelve hours after the drug is stopped and then to fall slowly but steadily to normal.

(7) *Acidosis.* With sulphanilamide, as with aspirin, one has to be careful not to produce acidosis. With Dagenan and sulphathiazole this aspect need only be considered when the patient is a diabetic. Even then, grains x of Bi-

carbonate of Soda with each dose of Dagenan is sufficient to remove worry.

(8) *Liver Damage.* There is no good evidence that Dagenan causes liver damage as sulphanilamide may. In fact, the urobilinuria of toxic liver damage in pneumonia clears rapidly with the treatment of the underlying disease by Dagenan.

When to Discontinue Dagenan:

There is no set rule as to how long Dagenan should be continued. It is a bacteriostatic rather than a bactericidal agent. If the drug is stopped too soon, a few lurking organisms may grow as if Dagenan had never been given and the disease will blossom anew. If treatment is carried on too long, the chances of a toxic reaction increase. If the physical signs are diminishing, it is usually safe to stop the drug after three days of normal temperature.

Use of Soludagenan

Soludagenan is the soluble sodium salt of Dagenan supplied in 3 c.c. ampoules containing one gram of the salt (i.e. 33% solution). This preparation is highly alkaline in reaction (p.H. 11) and therefore irritating if not diluted. It is indicated in:

(1) Unconscious patients or patients who are unable to swallow.

(2) Seriously ill patients who have exhibited excessive vomiting with the oral preparation.

(3) Post-operative patients or cases of Addison's Disease, in whom there is grave risk if vomiting is initiated.

For intramuscular use one ampoule should be diluted to 8 or 10 c.c. For intravenous use, one ampoule should be diluted to 15 or 20 c.c.—in both cases by either distilled water or saline. Each route has its advantages. When given intramuscularly there is no thrombosis of veins and the blood level is kept more constant by the absorption period. However, it takes longer to reach a high blood level and particularly if there is congestive failure, absorption may be very slow indeed. When given intra-

venously, an effective level may be established at once, but there is also a more rapid decline and a period of possible loss of effective blood level just before the next injection. A combination is often used.

The dosage of Soludagenan is usually relatively higher than of Dagenan, because the patient is usually critically ill. On a 2000 c.c. fluid intake a case of generalized peritonitis following a ruptured appendix should be given one gram intravenously and one gram intramuscularly initially and then one gram every four hours for the first twenty-four hours. One gram every six hours may be necessary in the second twenty-four hours and then one gram intramuscularly every eight hours until discontinued. It should be remembered that most such patients will be receiving intravenous glucose or saline and that the dosage of Soludagenan will depend as much on the fluid intake as on anything else.

There is even more reason to watch for toxic manifestations with Soludagenan than there is with oral Dagenan. This is particularly true in cases of meningitis, where, in order to reach a high concentration in the spinal fluid to combat virulent organisms, excessive blood levels are necessary. It is not uncommon in such cases to give as much as 2 grams of Soludagenan every four hours for several days in an effort to ward off a fatal issue.

A case of pneumonia treated with Soludagenan would be given an initial dose of two grams followed by one gram every six hours for the first day and by one gram every eight hours for ensuing days, provided progress was satisfactory.

With parenteral Dagenan, the blood level should be determined half way between injections in order to estimate the average concentration during the interval. It should be noted that no tube, syringe or needle used to take fluid for a Dagenan level should be contaminated in any way with local anaesthetic (novocaine), since it gives the same colour with the reagents as does Dagenan and thus will totally invalidate the result.

THE COLLAPSE THERAPY OF PULMONARY TUBERCULOSIS

By L. W. THOMPSON, M.D.
Toronto Hospital for Consumptives

The surgical treatment of pulmonary tuberculosis may be said to have been introduced to this continent in 1912, when Professor Archibald of Montreal performed his first thoracoplasty. It was accepted only slowly by physicians, and not until careful follow-up records began to impress upon the profession the gloomy prognosis of chest tuberculosis when treated by rest alone. More wide applications of surgical measures were retarded at first by the relatively high operative mortality of the measures then in use. This high mortality was due in part to the doing of too extensive operations; also, as is always the case with newer methods of surgical therapy, only to apparently hopeless cases, and therefore very ill patients were submitted for operation.

Prognosis

A survey made at the Chicago Municipal Sanatorium, report of 1935, before collapse therapy had been widely accepted there showed that 90 per cent of moderately advanced and far advanced cases were dead within five years after the appearance of positive sputum on direct smear. Simpson found that 60 per cent of all patients with X-ray evidence of cavitation were dead within five years. McMahon and Kerper found that there was only a 17 per cent chance of cavities closing in patients under twenty-five years of age when they were treated by bed rest alone.

X-Rays of Chest Always Necessary

More general realization of the limitations of physical examination alone in pulmonary tuberculosis has had an influence not only upon the diagnosis but also upon the treatment. It is now generally accepted that roentgenograms of the chest are essential before tuberculosis can be excluded once it has been

suspected. It is perhaps more recently recognized that they are essential in order that any opinion may be formed as to the extent of the disease. It can be stated that generally speaking physical examination cannot be depended upon to reveal more than 25 per cent of the pulmonary involvement in any given case. Bendove studied 350 cases with tuberculous cavities and found that only 29.7 per cent exhibited cavernous breathing while in 9.4 per cent there was no inkling whatever of the presence of a pulmonary lesion. An X-ray of the chest must always be taken before pulmonary tuberculosis can be excluded, as a cause of obscure *fatigue*, loss of weight, "smokers cough", "nervous breakdown", "atypical hyperthyroidism," etc. Pulmonary tuberculosis can mimic almost any other pulmonary disease, but its early symptoms are frequently referred to other organs.

Pathology

Pulmonary tuberculosis is an infection with an incubation period of months to years. Re-invasion (secondary, adult) pulmonary tuberculosis is presented for treatment in three stages or types of reaction. They are: 1. Early inflammatory exudate into the alveoli without appreciable tissue destruction; 2, caseous necrosis in the centre of the inflammatory mass, and, if the necrotic caseous material is expelled or absorbed a cavity is produced; 3, a resorption of the exudate and fibrous replacement of the necrotic parenchyma. A patient may exhibit only one type of reaction at one time or all three may be present, depending on the dose and virulence of the infecting bacilli, the resistance of the host and type of treatment and time it was applied. All caseous disease has passed through an inflammatory phase. All cavitation must be preceded by

caseation. With a good history and X-rays of a patient an experienced clinician can classify the type of disease present.

It is only necessary to recall the intense inflammatory focal reaction produced by injection of minute amounts of tuberculin in doing the Mantoux test to understand that much of the X-ray shadow shown in early tuberculosis is cast by an exudate in the alveoli and does not necessarily indicate parenchymal destruction. If treatment is promptly applied to a patient with reasonable resistance this exudate is resorbed, leaving a lung which is practically normal on X-ray appearance.

On the other hand, it is logical to expect a human response to re-invasion tuberculosis, similar to the Koch phenomenon in animals, i.e. acute localized inflammatory reaction, necrosis, sloughing and healing by fibrosis. But the amount of healing that usually takes place by resorption as shown by serial X-rays of humans is amazing.

This resorption takes much longer than is the case for usual bronchopneumonias. Unfortunately, most patients only resorb part of their disease and are left with areas of caseation. Such caseous areas may liquefy and form cavities very early in the course of the disease or the caseous areas may remain stationary for years with the disease classified as apparently arrested. These areas are prone to breakdown when the patient gets an intercurrent infection, i.e., influenza, perhaps due to a reaction related to the Schwartzman phenomenon. For this reason the lung surrounding such caseous areas should be collapsed so that they will become safely encapsulated. Fibrotic (productive) healing of caseous areas produces the typical picture of chronic pulmonary tuberculosis. This fibrosis, for the most part, merely represents the tissue reaction to cell destruction similar to the healing of a 3rd degree burn, but some of it is due to a specific stimulation of fibrosis by some of the fatty constituents of the tubercle bacillus.

Cavities are produced when caseous areas liquefy. If the necrotic material is expelled through a bronchus producing

positive sputum they are called open cavities. If, as occasionally happens, there is no communication with a bronchus and the sputum is not positive they are called closed cavities but the prognosis is almost equally as bad. The elastic tension of healthy lung, pulling in all directions on a necrotic area, may produce a hole in the lung much greater than the size of the caseous area. The mechanisms of cavity healing are not fully known. General and local rest are important. Clinically the important thing to do to promote healing is to bring about apposition of the cavity walls by completely collapsing that area of the lung.

Efficient collapse is accompanied by a marked decrease in the blood flow through that portion of the lung sufficient to inhibit the growth of tubercle bacilli by anoxia and to promote ischaemic fibrotic encapsulation of the caseous areas. Tuberculous cavities do not commonly heal by fibrotic synthesis of the walls and rarely heal by epithelialization of their lining. Bronchiectasis is a common accompaniment of fibrotic healing but because it is usually situated in the upper lobes it rarely produces symptoms. Good X-rays, especially a series of X-rays at intervals, indicate the pathological anatomy of pulmonary tuberculosis better than any other method, but blood investigations and physical examination are useful supplements for a classification and prognosis.

Types of Collapse Therapy and Their Objectives

Until recently it was customary to speak of surgical treatment of pulmonary tuberculosis being used to accomplish specific objectives such as closing cavities, abolishing sputum or rendering it negative for tubercle bacilli, controlling haemoptysis and fever, and reducing toxæmia, etc. But it is better to think of collapse therapy as a variety of treatments to be used in a co-ordinated manner, and if necessary, in planned sequence, to produce a permanent cure of pulmonary tuberculosis in as short a time as possible. The ideal treatment should produce a complete collapse of

the diseased area with as little interference with the function of the healthy portion of the lung as possible, i.e., *selective collapse*. Thus collapse can be carried out simultaneously on both sides. The commonest forms of collapse in the present order of their importance are:

- 1. *Artificial pneumothorax*, supplemented if necessary by closed intrapleural pneumonolysis.
- 2. *Thoracoplasty*.
- 3. *Phrenic nerve operations*.
- 4. *Extra-pleural pneumothorax*.
- 5. *Oleoathorax*.
- 6. *Monaldi operation*.

Artificial Pneumothorax (A.P.)

Artificial pneumothorax is the most widely used form of collapse therapy, being attempted on more than 70 per cent of sanatorium admissions, most of the other 30 per cent of cases having hopelessly far advanced disease. Artificial pneumothorax has the advantage of being attended by no surgical shock, and being done under local anaesthesia by men with much less surgical training than is required for thoracoplasty. The amount of collapse can be easily and quickly controlled and can, in the absence of adhesions, usually be made selective so that simultaneous bilateral collapse can be used. In the case with a cavity surrounded by solid pneumonic exudate the collapse can be increased gradually as the exudate is absorbed. Artificial pneumothorax is the ideal form of treatment for disease predominately inflammatory in nature, be it minimal, moderately advanced or far advanced in extent. There is reasonable hope that the lung can be allowed to re-expand at the end of five or more years and that it will be fairly normal.

If X-rays and history indicate exudative or caseous disease of moderately advanced or far advanced extent, with or without cavities or positive sputum, artificial pneumothorax should be attempted at once. It is permissible to do a phreniclasia and then X-ray the patient at the end of three months in the case of minimum exudative disease. If this X-ray does not show really good absorption, artificial pneumothorax should be started. It is still the custom to attempt artificial pneumothorax on fibrotic disease before doing a thoracoplasty. One of the disadvantages of artificial pneumothorax is the necessity for frequent refills of air every three or four days at the start and later at intervals of 1 to 4 weeks. This means that the staff of a sanatorium spends considerable time in giving refills. At the Toronto Hospital for Consumptives, Weston, there were 530 air injections given in 1932, 717 injections in 1933 and by 1939 this number had increased to 7,180.

The influence of pneumothorax on the mortality in pulmonary tuberculosis is illustrated by Cedric Shaw's study of 267 cases of pulmonary tuberculosis who had pneumothorax induced between 1922 and 1930 and were reported in 1933. See chart A below.

The urgency of diagnosing pulmonary tuberculosis by always getting X-rays is illustrated by the comparative mortality of minimal and far advanced cases. An artificial pneumothorax should always be under the supervision of an experienced pneumothoracist. In the early stages frequent X-ray films should be taken and even in the late stages frequent fluoroscopic examinations should be made. The X-ray appearance is the best criterion of efficient collapse.

CHART A. Comparative Mortality

	Bed rest only	Pneumothorax
Minimal cases.....	19%	0
Moderately advanced cases.....	43.5%	10.6%
Far advanced cases.....	71%	47.5%

Of course tubercle bacilli must be eliminated from the sputum. Inefficient artificial pneumothoraces, which cannot be made efficient by supplemental intrapleural pneumonolysis or phreniclasia, should be abandoned at once and phreniclasia, thoracoplasty or extrapleural pneumonolysis substituted. Artificial pneumothoraces with adhesions are prone to develop large effusions and later empyema. If the diseased area is not well collapsed exacerbations are very common even though the patient is temporarily improved.

The importance of closing cavities, i.e., bringing about apposition of their walls and eliminating tubercle bacilli from the sputum, is shown by the following comparative results as reported by J. Burns Amberson, Jr., on a group of patients observed over eight years. See chart B below.

Intrapleural Pneumonolysis

The efficiency of any artificial pneumothorax varies, almost directly, with completeness of the collapse of the diseased areas. Therefore, an attempt is made to sever adhesions in more than 50 per cent of artificial pneumothoraces. The usual method of cutting the adhesions is by the closed method done under local anaesthesia, i.e., the adhesion is viewed through an instrument similar to a cystoscope which is introduced into the pleural cavity through an intercostal cannula. Through a second cannula a galvano cautery is introduced and the adhesion burned off at its parietal attachment. Bleeding is controlled by electro coagulation. If all the adhesions can be divided apposition of the cavity walls can be brought about in 90 per cent of cases attempted. Occasionally the adhesions are too large to be separated from the chest wall without undue risk

of haemorrhage or rupture of the tuberculous cavity into the pleural cavity. The chest is opened under general anaesthesia and the adhesion stripped off the chest wall in the endothoracic fascia layer under direct vision.

Extrapleural Thoracoplasty

Because of wide-spread adhesions between the visceral and parietal pleura it is not possible to establish an efficient artificial pneumothorax in about 40 per cent of cases attempted; other means must then be adopted to collapse cavities. The commonest and best is subperiosteal resection of the ribs over the tuberculous cavity. This is usually done under general anaesthesia. An attempt is made to collapse completely the diseased area by complete resection of the upper ribs, transverse processes of the vertebrae, and costal cartilages. Fortunately, tuberculosis is usually located in the apex so that it is often not necessary to resect any of the ribs below the 5th to 7th, i.e., one produces a selective collapse. Thoracoplasty has the advantage that three months after the operation a firm chest wall has been produced in the new position by regrowth of rib from periosteum moulded in close to the mid line. Thus the diseased area is permanently collapsed and the possibilities of late complications reduced to a minimum. The ideal case for thoracoplasty is one in which most of the exudate process has been resorbed and active fibrosis is going on. Good results are obtained from thoracoplasty on cases without fibrosis, but it would be foolish to attempt collapse of tuberculous pneumonia by thoracoplasty. It would not be possible to collapse completely the consolidated lung which would very likely slough, leaving a cavity, after the chest wall had become

CHART B

	Cases	Alive	Well
Cavity closed.....	82	89%	91% of living
Cavity not closed.....	68	33.8%	50% " "

firm again. In addition, these patients are usually too ill to stand thoracoplasty. Patients who have had tuberculosis five or ten years or longer are usually poor risks for thoracoplasty. They are likely to have tuberculous bronchitis or enteritis and, like patients with other chronic infections, may have degenerative changes in vital organs. The old stiff fibrotic walls of the cavity are difficult to collapse. It is often necessary to do a thoracoplasty on chronic tuberculous empyema.

That thoracoplasty is not a lethal procedure but is a highly successful therapeutic measure is shown by the results of 192 cases operated on at Toronto Hospital, Weston, before September 1939, by Dr. R. M. Janes. One hundred and nineteen cases were still in good general condition, 73 cases had an absolutely hopeless prognosis without operation but were so treated in an attempt to get them out of sanatorium with negative sputum. The combined operative mortality was 5.1 per cent. Sputum was converted from positive to negative in 82 per cent of the combined group. See chart C below.

Phrenic Nerve Paralysis

Hemidiaphragmatic paralysis has the disadvantage that it usually interferes with the function of healthy lung, as much as or more than the diseased part. This, of course, would not be the case when the tuberculosis is limited to the

lower lobe, which occurs in more than five per cent of pulmonary tuberculosis although diaphragmatic paralysis causes rest and relaxation of the diseased area of the lung. It cannot produce complete collapse such as is possible with pneumothorax. The final results are therefore much poorer than with artificial pneumothorax or thoracoplasty. Nevertheless, phreniclasia has a wide field of usefulness in speeding recovery from minimal lesions and in preparing patients with advanced disease, on whom artificial pneumothorax cannot be established, for thoracoplasty. Phreniclasia is also a useful supplementary measure to some inefficient artificial pneumothoraces. The usual custom is to crush the phrenic nerve. This produces a paralysis lasting about six months on an average. It may then be repeated if necessary.

Extrapleural Pneumonolysis and Pneumothorax

Extrapleural pneumothorax has most of the advantages of an ordinary artificial pneumothorax but because of the proximity of the tuberculous process to the pleura, empyema is a common complication when artificial pneumothorax has been unsuccessful. Extrapleural pneumonolysis is indicated in the treatment of apical, predominately exudative or caseous disease with cavitation. Extrapleural pneumonolysis can be used where the type of disease and general condition of the patient contra-

CHART C

	Favourable cases 119		Unfavourable cases 73	
	No.	%	No.	%
Working full or part time.....	84	70.6	22	30.1
Improved.....	25	21.0	23	31.5
Unimproved or worse.....	5	4.2	9	12.3
Dead.....	1	late 0.8	9	late 12.3
	1	op. 0.8	8	op. 11.0
Not traced.....	3	2.5	2	2.6

indicates thoracoplasty. If the cavity is more than 3 cms. in diameter or close to the chest wall extrapleural pneumonolysis is dangerous.

Oleothonax

A quite successful method of treating early tuberculous empyema is to fill the cavity with oil containing 2% to 10% gomenol. Olive oil seems to be better than paraffin. Because of the not infrequent development of bronchopleural fistulae when the underlying lung was badly diseased it is losing some of its popularity. Oil filling instead of air is also used to prevent premature re-expansion of the lungs in early obliterative pleuritis.

Monaldi Operations

Recently continuous closed drainage of tuberculous cavities using continuous suction has been introduced by Monaldi for the treatment of patients who are poor risks for thoracoplasty and who have large cavities which drain poorly.

Rest

As has been indicated above, rest alone will not permanently cure cases of pulmonary tuberculosis; nevertheless,

it is still to be used in conjunction with collapse therapy.

Summary and Conclusions

1. Pulmonary tuberculosis is an infectious disease of bacterial origin with a long inconstant incubation period.
2. In an individual with a positive Mantoux to 10 mgms. or less, good chest X-rays are necessary before pulmonary tuberculosis can be excluded in differential diagnosis.
3. X-rays are necessary to determine the amount and type of disease present and treatment indicated.
4. Re-infection pulmonary tuberculosis is primarily an inflammatory reaction.
5. The mortality varies directly and the working capacity inversely with the stage of the disease when it is brought under treatment.
6. Collapse therapy greatly improves the prognosis as compared to bed rest alone.
7. X-ray evidence of elimination of cavities is the best criterion of efficiency of such collapse so far as final prognosis is concerned. It is presumed that tubercle bacilli are eliminated from the sputum.

Monday, February 20-1728

"This Morning about 8 o'Clock the famous Dr. Urban, having for some Time past been poffers'd with a violent Frenzy, broke loose from his Nurse, and ran all thro' the streets of London and Westminster distributing Quack-bills, swearing he would go visit his beautiful Garden of Eden; raving against Common Sense and the London Magazine, and singing a mad Song set to Musick by Peter the wild Youth; but being at last secured was convey'd to his Lodgings in Moorfields, where he continues uttering horrid Imprecations against several Booksellers and Printers. 'Tis thought this Poor Man's misfortune is owing to his having lately perplexed himself with Biblical Questions, Mathematical Problems, Astronomical Equations, and methods to find the Longitude."

The London Magazine
and Monthly Chronologer.
Printed for T. Astley, at the Rose
over-against the North-Door of
St. Paul's.
(From the Library of J. W. Scott.)

A PROBLEM IN DIAGNOSIS

By C. B. BROWN, M.D.

From the Medical Service, St. Michael's Hospital

[To stimulate interest, we are this year offering a prize of a ticket to the Meds-at-Home, for the best answer to these problems in diagnosis. Answers should be in writing, about 200 words in length, including a Differential Diagnosis and Diagnosis, addressed to the "Problem in Diagnosis" Committee, University of Toronto Medical Journal, Room 107, Anatomy Bldg. This is open to all students, but it is hoped that any student who may have seen the case before will remain discreetly quiet. The prize will be given to the one who most logically correlates symptoms and findings with the correct or nearly correct diagnosis. In next month's journal there will be the pathological report, together with a discussion of the case, and the winning student's answer.]

This is the history of a thirty-nine year old Polish male who first presented himself at the O.P.D., St. Michael's Hospital, March 10th, 1940, with the following complaints:

1. Loss of twenty-five lbs. in weight over five months;
2. Abdominal pain five months;
3. Belching of gas and distension of abdomen five months;
4. Generalized weakness three months;
5. Shortness of breath on exertion three months;
6. Loss of appetite three months.

He was in good health until five months prior to his coming to the Clinic. At that time, he began to suffer epigastric pain which was unrelated to meals. This gradually became constant. In an attempt to overcome this, he had gradually eliminated from his diet everything except milk, oatmeal, eggs and oxo. The other symptoms developed in the order listed above.

He obtained some relief from alkalis. There was no history of nausea, vomiting, irregular bowel habits or abnormal stools.

Functional inquiry	} Irrelevant
Family history	
Personal history	
Past illnesses	

Physical Examination

Temp. 97° F. Pulse 76/M. Respirations 20/min.

This is a thin, sallow, young adult male with thin chest, face, extremities and protuberant abdomen.

Head and neck: Essentially negative. No tracheal shift.

Chest: Long, thin, emphysematous chest; movement poor but equal. Resonant throughout. Vocal fremitus present and equal throughout.

Breath sounds coarsely vesicular. No adventitious sounds. Vocal resonance present and equal throughout.

Cardiovascular system: B.P. $\frac{120}{90}$. Rate 76/min. No cardiac enlargement. Rhythm regular. Sounds normal, no adventitious sounds.

Abdomen: Distended and protuberant. Umbilicus reduced to a slit. Skin thin and shiny. Veins visible over abdominal wall. Some bulging of flanks. Abdomen freely movable on respiration.

No abdominal tenderness. Liver edge felt $1\frac{1}{2}$ inches below costal margin on dipping. Nodular mass, poorly outlined felt in the L.U.Q. Movement of mass on respiration doubtful.

Dullness in the flanks on percussion. Shifting dullness present.

Rectal examination: negative.

Genito-Urinary system: Normal adult male.

Glandular system: No superficial, palpable glands.

C.N.S.: Essentially negative.

Back and extremities: Slight pitting oedema of ankles.

Laboratory findings: Hb. 80%. Blood wasserman negative. Urine clear.

X-ray: Gastric series negative.

March 15th, 1940

He returned to the O.P.D. with the following additional complaints:

1. Marked shortness of breath on exertion;
2. Marked swelling of abdomen;
3. Swelling of feet, ankles, legs and scrotum;
4. Difficulty in making bowels move.

Physical examination at this time had changed in the following respects:

1. High diaphragm and scattered rhonchi throughout chest;
2. Marked ascites with very prominent veins over the anterior abdominal wall. The direction of flow in these veins was normal.
3. Pitting oedema up to and including lower abdominal wall.

March 16th, 1940

On admission his temperature was normal. That evening it rose to 100° F. and thereon swung daily between 97° F. and 101° F. Pulse varied between 90/minute and 130/minute, showing no inclination to follow temperature on the chart. Respirations varied between 18/minute and 26/minute. Abdominal paracentesis was done. Following this, the abdomen was soft and flat. A firm, large, nodular mass could be felt in the L.U.Q. It extended beyond the mid line, below the umbilicus, moved slightly on respiration and could be moved laterally.

March 23rd, 1940

A flat plate of the chest was made. No pneumonia could be demonstrated clinically. The throat was not inflamed and the urine was clear.

The X-ray report may be summarised as follows:

1. The heart was normal in size.
2. There was no evidence of fluid within the chest.
3. The left lung was clear.
4. There was evidence of an old, fibrous tissue reaction on the right side. At the lung root there was a density which extended for 1½ inches from the right lateral vertebral line into the lung field opposite the first and second interspaces anteriorly. Its periphery suggested an appearance of infiltration. Elsewhere the right lung was clear.

March 25th, 1940

A flat plate of the abdomen was taken following paracentesis. This showed the large bowel filled with gas. No renal shadows were seen. There was a generalized loss of brilliancy in the region of the mass palpated. No further information concerning the mass was given.

This man failed steadily. The oedema of the lower extremities persisted. He developed a right-sided pleural effusion. The abdomen refilled quickly following paracentesis. This was repeated five times yielding a total of twenty litres of fluid. He finally developed signs of uraemia and died April 5th, 1940.

Laboratory Examination

A. Blood work:

Hb. 72%

Red blood count 3.6.

White blood count 5.6 and never above 10.8.

Blood films showed slight hypochromasia.

B. Blood chemistry:

On admission—

Urea 12.8 mgms./100 cc. of blood.

Creatinine 1 mgm./100 cc. of blood.

Sugar 88 mgms./100 cc. of blood.

April 5th, 1940—

Urea 39.5 mgms./100 cc. of blood.

Creatinine 2.5 mgms./100 cc. of blood.

Cholesterol 165 mgms./100 cc. of blood.

Blood wasserman negative.

C. Examination of free fluid from abdomen:

1. Specific gravity 1015.
2. An opaque yellow fluid which yielded a sediment of gelatinous consistency. Greasy to touch.
3. Laughlin test negative.
4. Smears showed a few red blood cells, a few lymphocytes, a few large endothelial-like cells and no bacteria.
5. Culture was sterile.
6. Guinea pig inoculation did not produce any typical lesions.

SUTURES AND LIGATURES

By DAVID M. BEAN, '41

With the development of suture and ligature preparation from an Art to an exacting Science, the surgeon of today finds himself confronted with a host of variously prepared materials. In the light of new clinical experience these must constantly be re-evaluated.

The purpose of this article is to present concise information, which, it is hoped, will be of both interest and practical value to the prospective interne.

Definitions

Suture: A suture is material used to sew or stitch tissues together. The noun is frequently used to designate all materials used for either suturing or ligating.

Ligature: A ligature is used to encircle and tie off a blood vessel or tissue, in such a manner as to cause hemostasis.

Absorbable: This is the term given to materials digested by enzymatic processes in the tissues in which they are embedded (catgut, kangaroo tendon).

Non-absorbable: This term designates those materials not so digested. In this category are retention sutures of dermal, metal wire and silkworm gut as well as buried sutures of silk, linen and cotton thread.

Absorption: This process is preceded by a local dilatation of the capillaries and small veins together with the release of inflammatory cells and plasma cells. The predominant polymorphonuclear leucocytes within three to five days give way to the lymphocytes which in turn are largely replaced by macrophages by the tenth day. The strand soon becomes softened and swollen. The proteolytic enzymes from the disintegrating neutrophils and macrophages are chiefly responsible for the disintegration of the collagen complexes of the suture strand. Fibroplasia begins about the fourth day and by the fourteenth day the suture is no longer necessary.

It is well to remember that the knots are the last part of a ligature to be absorbed. During their stay in the tissues they are responsible for a large proportion of the inflammatory reaction. Greater suture strength may be obtained with a smaller knot by employing a double suture of, say, double 0 rather than No. 1.

Historical

Sutures of today are the culmination of man's struggle for a controlled method of healing wounds. A brief glimpse into the history of sutures is at once both illuminating and fascinating. In the beginning men perished from hemorrhage. With the growth of knowledge fewer died of hemorrhage and most from infection introduced into the wound while arresting bleeding.

About 1000 B.C. the Indian, Susruta, recommends in his book the "Agar Veda" that cotton, strips of leather, fibre from the bark of trees, plaited horsehair and animal sinews be used as sutures.

Galen, 80 A.D., is the first to identify the name of catgut with the suture material now used so extensively in surgery. The word is believed to be derived from kitgut or kitstring. This cord was the fiddle string made from twisted sheep intestine.

In the 16th century Vesalius mentions the ligature as a relic of the past, but in 1739 Heister's Surgery again advocated its use.

Catgut fell into disrepute in the succeeding decades due to the severe infections which resulted. In spite of this, Dr. Physick of Philadelphia (1816) re-introduced catgut into vogue after considerable animal experimentation.

Listerian methods in surgery (1869) re-opened the controversy. Every conceivable suture material of cord nature appears, disappears and reappears again. Among these are copper, gold, aluminum, silver, iron, bronze and steel wire; silk, silkworm gut, linen and cotton cord;

tendons from a host of animals and birds—ox, kangaroo, rat, whale, raccoon, deer, man, heron and crane; the intestinal material of many and varied creatures; catgut, impregnated with innumerable chemicals—iodine, mercury, iodoform, silver, thymol, carbolic acid and anilin dyes: it was toughened with tannin, formalin, chromic acid; it was treated with dry heat and moist heat; it was immersed in oils, chloroform, turpentine, ether and a host of other substances.

Investigation of good surgical catgut has rendered questionable the Listerian principle of chemical sterilization, heat now replacing the older method. Yet with all the modern refinements, the aseptic and antiseptic ligature must be accredited to Joseph Lister whose researches and labours form the basis of all suture preparation of today.

Types, Gauges, Some Uses

Silk: Silk is prepared by unreeling the cocoon of a species of caterpillar known as the silkworm. As thread it is very strong and elastic. Twisted or braided varieties are available, dyed black, bleached white, or left in the native creamy orange colour. Common sizes are Nos. 5, 9 and 12 for the twisted, and Nos. 4, 7 and 10 for the braided. These gauges correspond to catgut Nos. 1, 2 and 3.

Silkworm gut: This is a smooth, creamy white lustrous material produced from the unspun silk of the silkworm. Fine, medium, coarse and extra coarse gauges are available in 12-inch to 18-inch lengths.

Linen: Linen thread, white or dyed black, is relatively stronger than silk. It has the same usefulness and limitations as silk. Should the wound be infected, the encapsulation of the thread by a foreign body reaction retains bacteria there as a focus of infection. Sizes most in demand are No. 2 and No. 4. Occasionally linen is impregnated with celluloid (to overcome capillarity) and thus prevent infection being drawn into the wound along the strand. (Pagenstecher's suture.)

Horsehair: Coming as it does from the tail of the horse, this material is subjected to careful sterilization. It is useful in fine cosmetic work, but the limited length, low tensile strength and variation in gauge along the strand has resulted largely in its replacement with fine dermal. It is marketed dry and unsterile, 100 strands to the box, or as a single twenty-inch length in a sterile tube.

Dermal: This suture consists of silk fibres coated with a stable, non-capillary substance and then dyed. Retention sutures of dermal are Nos. 1, 2 and 3, while plastic sutures are 0000. Abdominal and other skin wounds are commonly closed with No. 0 or 00.

Catgut: Manufactured from the submucosa of selected fresh sheep intestine, this material is widely used in both treated and untreated forms. More widely used gauges are 000, 00, 0, 1 and 2, but finer gauges up to 5-0 and coarse catgut up to No. 5 are also marketed.

Metallic Sutures: In the form of annealed (dead soft) wire, steel and silver alloys are widely used. The steel is frequently used in the No. 35 gauge (tensile strength $2\frac{1}{2}$ lbs.—equal to plain 0 catgut). Also commonly employed are Nos. 22, 25, 28 and 30. The slightly antiseptic silver wire is chiefly No. 32 and No. 30, but Nos. 16, 18 and 20 are also available. Annealed wire is especially useful on or adjacent to mucous surfaces in such operations as the repair of vesicovaginal fistulae.

Fascia and Tendon: Kangaroo tendon is almost the only commercial tendon marketed today. It is to be had in fine, medium and coarse sizes.

Umbilical tape: This ligature is of a special weave of cotton, $\frac{1}{8}$ inch wide, and used almost exclusively in ligation of the umbilical stump. Tape is procurable in bottles containing 24 yards of it.

Skin clips: Michel metal clips can be quickly applied with a minimum of discomfort to the patient on removal. Proponents believe there is less chance

of infection as clips do not pierce the subcutaneous fat. Large ($\frac{3}{4}$ inch), medium ($\frac{1}{2}$ inch), and small ($\frac{1}{4}$ inch) sizes are used.

Modern Preparation of Catgut

The manufacture of modern catgut is carried on in laboratories situated adjacent to the larger abbatoirs (Chicago). Selected sheep intestines from government inspected animals are conveyed to the laboratories, where they are put into process within a few hours of the animal's death.

Extensive washing and conditioning is carried out in cold water, following which all layers of the gut except the submucosa are removed by expert scraping. The wide piece of submucosa is then slit into three strips, the strip with the mesenteric attachment being set aside for use in the production of racquet gut. The remaining strips are then twisted together, the number of strips determining the gauge.

The strands are next put under tension and dried. A preliminary polishing is given with a fine abrasive. Three standard types are prepared, viz., Plain, Medium Chromic (20-day) and Extra Chromic (40-day).

Further processing involves the inspection for quality, chromicizing for toughness and delayed absorption, oil bath sterilizing, culturing a sample to ensure sterility, and aseptic sealing of the catgut into sterile tubes. The pliability of non-boilable catgut is also checked as well as the gauge. Free chromium (i.e., not a chromium-collagen complex) must not be found in a sample as it is very irritating in the tissues.

Each batch of catgut is sampled and tested for tensile strength and rate of absorption. Customary standards are:

1. Tensile strength.

Gauge	Straight Pull	Surgeon's Knot
00	4 pounds	2.8 pounds
0	6 "	5 "
1	9 "	7 "
2	12 "	9 "
3	17 "	11 "
4	20 "	14 "

2. Rate of Absorption.

	Gauge	Absorption Rate
Plain	000	3 days
	00	4 "
	0	4½ "
	1	5 "
	2	6 "
	3	7 "
Medium Chromic . . .		20 "
Extra Chromic		40 "

Sterilization and Storage

All tubes of catgut are always sterile on the inside. The exterior must be wiped free of grease before sterilization for an operation.

Boilable tubes contain NO water. These may be autoclaved without harm to the contents.

The presence of water keeps the catgut pliable. Catgut in boilable tubes may be made pliable by placing in a towel moistened with 70% alcohol for not more than 15 minutes for the heavier gauges.

Non-boilable tubes are NOT to be subjected to heat for sterilization of the outside of the tube. The solution in which the pliable catgut is lying contains water and autoclaving would produce dissolution.

The danger in chemical sterilization lies in the fact that pathogenic spores are occasionally left intact. This type of sterilization also results in a catgut which is very irritating to the tissues. "The so-called chemical sterilization of surgical catgut by any method yet devised is insufficient and unreliable. Carefully controlled heat sterilization is the only uniformly reliable and positive method of sterilization." (R. H. Clock, New York).

Knot and Suture Technique

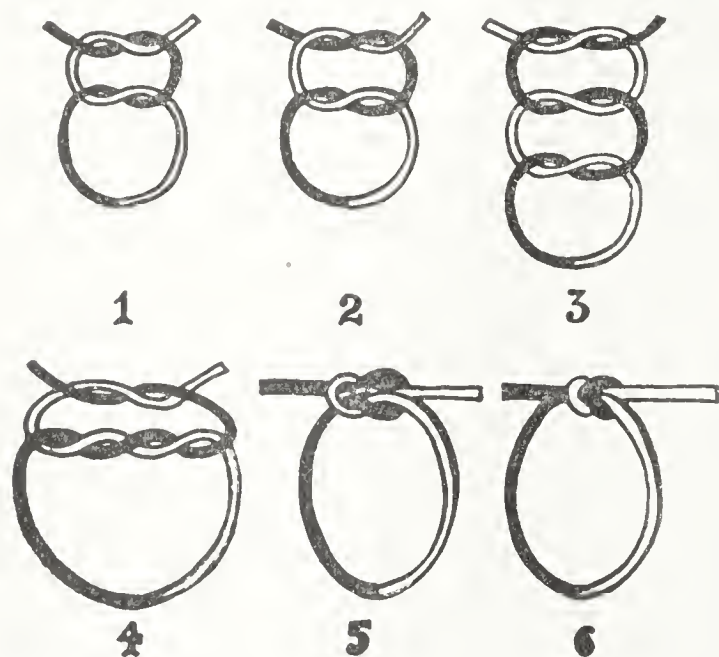
"Large bites of tissue ligated under tension lead to tissue necrosis. A careful operative technique must be developed based on a thorough understanding of wound healing. The best in aseptic technique must be routine. The minimum amount of tissue should be crushed in forceps and ligated, preferably the

vessel alone. The finest silk possible should be used in clean wounds. If the occasional ligature does not break, the silk is too heavy. The use of small needles, the taking of small bites of tissue and tying firmly but not too tightly, are essentials. The technique takes more patience and time but the improved results are more than adequate recompense." (Miller & Luke).

A general review of the recent literature allows some conclusions to be drawn:

1. Many suture failures are due to the knot rather than to the suture material, especially where the knots and sutures are subjected to any appreciable intermittent tension.

2. The safest of all common surgical knots is the triple throw knot. This knot is safest when all throws are tied square, but it is also quite reliable if any two of the three throws are tied square (see fig. 3).



1. Square knot.
2. Granny knot—misthrown square—unsafe.
3. Triple Throw Square.
4. Surgeon's knot.
5. Square knot, not pulled tightly—unsafe.
6. Same, pulled tightly.

3. The square knot is more reliable than the surgeon's knot as the latter is difficult to pull down tight enough to withstand slipping (see fig. 1).

4. The least reliable knot material is plain catgut, particularly pliable (non-

boilable) type. This is seldom safe in square or surgical knots and fails even in the triple square knot.

5. From the standpoint of the knot, chromic catgut is much safer than plain, though only in triple throw knots does it approach 100 per cent reliability.

6. A marked difference is noted in the holding power of catgut knots in dry and wet states. A knot which is perfectly safe when dry may readily slip out when moistened with serum.

7. Re failures in wet knots. Contrary to the common belief, wet catgut is NOT more slippery than dry. In fact the frictional value increases when soaked in serum. It is contended that failure is largely due to the great increase in the elasticity of catgut (especially plain) when wet with saline or serum. Another factor is the swelling of the catgut itself, which tends to loosen the knot.

8. Knots of linen or silk are much safer. Wetting produces no difference. Triple throw knots and square knots approach 100 per cent reliability.

9. Cutting suture ends shorter than 5 mm. for catgut and 3 mm. for linen or silk produces a distinct hazard to the knot.

10. Knots tied in larger gauges occasionally fail because the suture is too bulky or wiry to be pulled snug.

11. When the knot holds, then the next weakest point is the portion immediately adjacent to it, where suture fibres are fractured in tying.

Selection of Material and Gauge

This question admits of discussion from many angles but for the purposes of this brief article may best be considered in terms of the three ways in which sutures and ligatures can be used in (a) clean wounds and (b) infected wounds.

1. *Buried sutures.* Silk is mentioned first not because it should necessarily be used but because its use should always

be considered and favoured before deciding to use absorbable sutures. When surgery is to be conducted in an obviously infected or seriously contaminated field, it is best to use absorbable suture material due to the fact that non-absorbable sutures are slowly ejected by the wound before healing will occur. Triple 0 (000), double 0, and single 0 chromic catgut are the gauges of choice, heavier gauges occasionally being employed. It is well to keep in mind that a running suture of two strands of single 0 cause less irritation and have greater strength than one strand of No. 1.

2. *Skin sutures.* For the approximation of the edges a very fine non-absorbable, non-irritating suture is clearly superior to any type of absorbable material. For very delicate work, fine horsehair or an equally fine gauge of dermal is best, with the needle swaged on, rather than threaded. The swaged needle has no eye, the unpointed end bearing a slotted hollow section about three-sixteenths of an inch long, into which the suture is inserted and the metal compressed around it. Silk may give almost as good results as dermal.

3. *Tension sutures.* Here large sizes are best since they tend to cut less through tissue. They should be snug but not tight.

The size of a catgut strand is the obvious indication of its probable initial tensile strength. The rate of absorption is governed by the size and degree of chromicizing, other things being equal. In general, plain catgut is used in suturing sub-cutaneous fat, peritoneum, muscle, and for ligating blood vessels, the appendix and the neck of a hernia sac. Medium Chromic (20-day) is commonly used in suturing fascia, appendix and gall-bladder stumps, tendons, occasionally for gastro-intestinal tissue and for ligating large arteries. Extra Chromic (40-day) finds its chief usefulness in suturing of the cervix, vaginal walls, perineum, rectum, etc., where it is exposed to very strong secretions. Where close, uniform apposition with a minimum amount of trauma and cellular reaction are required (as in intestinal

anastomoses), interrupted sutures of 5-0 chromic are strongly recommended.

Alloy steel wire sutures are almost 100 per cent non-oxidizing and have great tensile strength even in finer gauges (No. 30 and No. 35). There is a very low incidence of infection, and less post-operative induration than with silk. Where absence of inflammation is essential as in vaso-epididymal anastomosis, silver wire (No. 30) has been used with as much success as has arterial silk.

In a preliminary report dated August, 1940, Burke of Vancouver advances the use of an unusually inert metal, Tantalum (73rd element), which he states "is uniquely resistant to corrosion, is as strong as steel, and can be stamped, machined and drawn into wire. The annealed wire is relatively inexpensive, but the metal itself is \$60.00 per pound.

The principles of silk technique are:

- (1) careful hemostasis,
- (2) gentleness,
- (3) fine silk, and
- (4) cutting close to the knot.

Silk causes less non-suppurating and suppurating complications than catgut. Fine silk will not delay healing in infected wounds if the infection is slight. It removes almost all necessity for drainage and is especially to be preferred in thyroidectomy.

The advantages of using a living suture such as fascia lata, lies in the fact that it may be used not only to unite living tissues, but is itself alive and may form an extensive portion of the new wall itself.

In the place of catgut many authors would have one employ silk or cotton thread. These are easily sterilized, are quite flexible, elastic, inexpensive, cause little tissue reaction and encourage early fibroplasia.

Halstead, commenting upon catgut, says: "The relatively high cost of catgut, its bulkiness, the inconvenience attending its use and sterilization, its inadequacy, the uncertainty as to time required for absorption, and the reaction it excites in a wound induced me to discard it completely in clean wounds."

Kraissl has postulated from extensive experimental and a short series of clinical

studies that sensitivity to catgut may be produced in the individual, resulting in rapid absorption and wound disruption. Frugoni, in rebuttal, declares that saline extracts of catgut contain not albumins but albuminoses, which have no antigenic power.

We should not be misled by the voluminous literature of recent date filled with arguments which if not directed against, at least urge substitutions for catgut. Catgut brings a mixed blessing to the surgeon. For the very desirable asset of absorbability it carries a number of liabilities. In infected wounds it is invaluable—its pliability, tensile strength and resistance to absorption being more than adequate when suitable gauges are employed.

However carefully the catgut may be prepared, individual variation in absorptive powers is enormous and apart from the suture itself, the endurance of the sutured tissue must be considered. Only by a clear understanding of the forces at work in the process of absorption can the surgeon select the proper size and type of ligature and suture for a specific technique.

We should recognize that the only permanent suture, if it is ever discovered, is one that is gradually embodied in the living tissues with no demonstrable irritation.

* * *

The author extends grateful thanks to Messrs. Warren and Sylvester '41 for their aid in preparing the engraving.

The Minde Corrupted

“Coming to extoll man unto the highest degree and step of his glorie, beholde him I pray thee the best furnished and most perfect of all living creatures, having (as I have sayd) in his soule the image of God, and in his body the modell of the whole world. And now I intend to set him out unto thee as the most caitiffe and miserable creature that is in the world, spoyled of all his graces, deprived of judgment, reason and counsaile, enemie of men and of the Sun, straying and wandring in solitarie places: to bee briefe, so altered and changed, as that he is no more a man, as not retaining anything more than the very name.

The Minde Alone Corrupted, The Body Standing Sound.

This alteration is seene oftentimes in the soule alone, the bodie standing sound and without blemish: as when a man by his malicious will becomming an apostate and revolt, defaceth the ingraven form of the Dietie, and commeth by the filthe of sinne to defile the holy temple of God, when through an unruly appetite, he suffereth himselfe to be carried in such headlong wise after his passions, either of choler, enule or gluttonie, as that he becommeth more outrageous than a lyon, more fierce than a tyger, and more filthie and contemptible than a swine. I goe not about to redresse this deformitie, I leave the discourse for the learned Divines. Yea and if a man doe but take some paines in morale Philosophie to reade it, shall find holesome precepts, for the staying and brideling of these foolish passions.

The Minde Corrupted Through a Corrupt Bodie.

I come to the other deformitie, which is violently thrown upon man, and may happen unto the most religious being, when the bodie, which is as it were the vessell of the soule is so greatly altered and corrupted, as that all the noblest faculties of the same, are likewise corrupted, the senses seeme all of them to wander and goe astray, every motion to be out of order, the imagination troubled, the reason foolish and rash, the memorie altogether given to slip and flie away whatsoever it should retaine. The first deformitie deserveth correction, as coming of a malicious minde and voluntarie action; but as for this which is constrained and violently inflicted by diseases, it deserveth to bee weighed of every one with a tender and charitable compassion.”

A Discourse of the Preservation of the Sight;
of Melancholike Diseases; of Rheumes, and of Old Age.
By M. Andreas Laurentius.

Translated by Richard Surphlet
1599

(Oxford University Press)

RHEUMATOID ARTHRITIS

H. H. MacKINNON, B.A., '41

Osler has said, "We must collect facts with openminded watchfulness, unbiased by crotchets or notions; fact on fact, instance on instance, experiment on experiment, facts which fitly joined together by some master who grasps the idea of their relationship, may establish a general principle". With regard to rheumatoid arthritis, a great multitude of facts have been collected, but we still await the coming of the master.

When Osler wrote his original text, he called this "a chronic disease of the joints of doubtful etiology"; and Meakins in his book states "the etiology of this disease, if it be a specific disease, is not known". Between these two statements lies nearly half a century of investigation.

A recent definition states that it is a disease characterized by a predilection for young women, pyrexia of a low grade, anemia, loss of weight, malaise, and symmetrical involvement of joints (usually the hands first).

Pathology

There is synovial hypertrophy and hyperplasia, with the formation of villi and redundant folds, thickening of subsynovial layers by edema. The synovial fluid is increased in amount though not usually to a marked degree. The articular cartilage is overgrown by the synovial membrane, and a "pannus" is formed which erodes the cartilage. Granulation tissue forms deep to the cartilage and destroys from below. Fibrous, and later bony, anklyosis develops. Microscopically there is vascular granulation tissue, and focal collections of round cells, usually perivascular. This focal round cell infiltration is said to be the earliest local sign of tissue reaction.

Wasting of the muscles about the joints occurs. In some cases rarefaction of bone and muscle-wasting may antedate considerably any evidence of intra-articular disease.

Subcutaneous nodules may be present, often on the back of the forearm. These have a central area of necrosis with an intermediate zone of large mononuclear zone of relatively fibrous connective tissue.

The pathological findings are those of inflammation, a reaction of the tissues to some noxious agent. But the arthritic patient presents other abnormal features than pathological joints. These indicate that rheumatoid arthritis is not merely a joint disease, but a generalized change involving the physiology and biochemistry of the entire body. These allied conditions may be predisposing causes of the disease, or may be effects of it. They may be inherent in the germ plasm, or may be brought about by environmental factors. The patient typically is anemic and emaciated; the limbs are cold and clammy, apart from the local heat about the joints; the surface temperature is lowered. There is a vasoconstriction of the capillaries, which are diminished in number and size. There is a lowered sugar tolerance; and there is frequently a vitamin deficiency.

The patient is a woman, four times out of five. The average age of onset is 37, though the disease may occur at any age. It is disease of the temperate zones, and is rare in the tropics. These are obviously significant facts, but just how nobody knows.

Laboratory Findings

The blood hemoglobin is below 90% in most cases; it bears no relation to the duration of the disease.

The white blood cell picture has been divided by Gibson into two groups:

(a) *Lymphoid type*, with neutropenia of varying degree, and a shift to the left (Arneth).

(b) *Polymorph preponderance*, with a shift to the right.

Erythrocyte Sedimentation Rate; increased in practically all cases, even when the anemia factor is corrected.

Blood Chemistry; Race (1930) demonstrated diminution of the plasma pigments; this has been corroborated by other workers. There is usually a decrease in total serum protein, with increase in fibrinogen and globulin, decrease in albumin, thus causing a change in the albumin-globin ratio.

Bacteriology: Cultures of blood, synovial fluid and joints have given varying results. Blood culture is negative almost without exception. Synovial fluid cultures have been reported both positive and negative. Different workers have isolated different organisms. Crowe and other workers have demonstrated Arthrotropic streptococci, which when injected into rabbits causes an arthritis not unlike rheumatoid arthritis.

Agglutination tests have been reported positive in fairly high titers, for hemolytic streptococci, both in serum and synovial fluid.

Skin tests with extracts of hemolytic streptococci are said to be positive at some time or another in 73 per cent of cases.

Theories of Etiology

Practically every known type of positive agent has been evoked as the major offender, and each has enlisted the belief and support of certain men. To the student approaching the literature for the first time, that belief and support seem occasionally to transcend scientific opinions and to come nearer religious fervour. But the majority of workers are in practice, and the exigencies of practice demand a more certain belief than the opinion of a laboratory worker.

The *infectious theory* has been the most widely accepted. Here, however, opinions differ as to the causative organism. A causative organism has not been demonstrated which satisfies everybody; and various microbes have been shown experimentally to satisfy Koch's postulates. Again, opinions differ as to whether the bacteria gain access to the joint, or exert

their ill effects by diffusion of a toxin from a *focus of infection*.

Many patients with rheumatoid arthritis do have chronic infections, and many have been remarkably improved by eradication of these. (Some writers would claim that, in this case, it was not rheumatoid arthritis.) Thompson, Wyatt, and Hicks, in a series of 343 cases, found foci of infection in 58 per cent. On the other hand, foci of infection may be found in as many, if not more, than do not have the disease.

The gross and microscopic pathology, the bacteriological reports, the raised sedimentation rate, the fever, occasional leucocytosis, the anemia, all strongly indicate an infectious basis for the disease. However, an infectious process affects the organism chemically, and all the changes noted may be produced by chemical reagents other than bacterial in source. The only certain demonstration that a process is infectious is the production of the microbe. Until workers can produce the germ beyond a doubt the theory must go unproved. The recent trend has been towards a more conservative outlook. Cecil and Angevine, former strong supporters of the infectious theory, concluded that "as far as typical rheumatoid arthritis is concerned, it would appear that chronic focal infection plays a comparatively unimportant role". They are probably as extreme in this view as they were in their former one.

Virus infection also must remain at present unproved.

Some investigators support the theory of an *allergic phenomenon*, but the agent responsible, bacterial or otherwise, has not been found. Even if an allergic factor is present, attack must be directed at the source, not the allergic reaction.

Other factors suggested have been vitamin deficiency, endocrine and metabolic disturbance, and anatomical changes in the gastro-intestinal tract, particularly a redundant and hypotonic colon. The supporters of these all present suggestive evidence, but none conclusive.

That certain *endocrine or metabolic* changes are present has been emphasized by Hench. No thyroid abnormality is

present, but there seems to be a connection with the sexual cycle. Various workers have observed that patients with atrophic arthritis have noted marked improvement with *pregnancy*. In Hench's series this occurred in all cases save an extra-uterine pregnancy. With early cases there was marked reduction of swelling, freedom from pain, and varying degrees of freedom of movement, in many cases complete. With older cases, freedom of movement was less due to advanced organic joint changes. The improvement started at varying times during gestation, and lasted after parturition or abortion for varying periods. It occurred in some cases in several pregnancies. How pregnancy works this miracle is unknown, and will remain so till a great deal more is known concerning the physiology of pregnancy.

Another phenomenon, considered of great significance by American workers is the fact that spontaneous obstructive or hepatic *jaundice* gives great relief to these sufferers, similar to the relief experienced in pregnancy. No significant lesion is present in the liver in rheumatoid arthritis; known tests of liver function show no constant hepatic insufficiency. Severe hepatitis without jaundice does not produce the remission of symptoms.

In this connection, the relation of sedimentation rate is interesting. Variations in sedimentation rate parallel variations in the serum concentration of fibrinogen, which is formed in the liver. Jaundice has been noted by some to cause a lowering of the sedimentation rate. Both sedimentation rate and fibrinogen concentration are raised in pregnancy as well as in atrophic arthritis; but, as noted above, pregnancy causes a remission of symptoms of arthritis.

Practically, an attempt has been made by Thompson and Wyatt, and by Hench, to produce this effect by artificial jaundice. Thompson and Wyatt had some success, Hench very little, though his methods differed only slightly from the others. Injection (intravenously) of bilirubin did not produce the desired result, but when introduced with bile

salts, did. Transfusions of icteric blood had no effect; and injection of a liver autolysate caused an exacerbation. Hench is of the opinion that some substance, as yet unknown, may be responsible for the remission seen in jaundice, and also in pregnancy.

In the cases of remissions that were observed many showed the presence of arthrotropic streptococci in foci of infection throughout the remission.

The importance of the phenomenon lies at present in the fact that such a progressive organic disease can be halted in a very short time by basically chemical means. Further work must be done to determine the mechanism; whether the effect is due to normal or abnormal bile constituents; the possible connection with cholesterol metabolism; and the relation of the physiological changes in pregnancy.

These intriguing problems may in the future change the practitioner's conception of rheumatoid or atrophic arthritis. For the present, we can only say that this disease may or may not require an infectious agent to precipitate it; such an agent will only precipitate it in an organism whose physiology is changed previously. Indications are that we may be able in the future to change that physiology so that the precipitating agent will have no effect.

Clinical Findings

These have in part been described above. The onset of symptoms may be acute or insidious. The acute onset in young women may resemble rheumatic fever, with pyrexia, headache, malaise, and migratory joint pains. The distal joints of the extremities are usually involved first; from these the disease spreads to involve the larger joints. Again, the onset may be insidious, with only a single joint affected for weeks.

Frequently the patient notices first paraesthesias of the extremities, muscular cramps, and loss of power. Flat-foot may develop due to weakness of foot muscles. Next, pain and tingling may develop in the fingers and arms, or feet. The metacarpo-phalangeal joints of the hands frequently show the first swelling. The pain

is not always in proportion to the swelling. The fingers develop a fusiform swelling (spindle joints) which is usually bi-laterally symmetrical. The larger joints become red and swollen, hot and tender.

Later, with bone destruction and muscle atrophy the joints become fixed in abnormal positions. The hands show ulnar deviation; the fingers are often flexed at the metacarpo-phalangeal joints and extended at the inter-phalangeal joints. The late picture is that of grossly deformed joints covered with glossy atrophic skin, and wasted muscles, resulting in great crippling and impairment of function.

X-ray appearance: Decalcification of bones, fusiform effusions symmetrically centred on the joints (particularly the joints of the phalanges) and punched-out areas of atrophic loss of bone substance at the juncture of the cartilage and bone. The X-ray findings are negative early in the disease.

Diagnosis

The main difficulties that will arise are connected with the differentiation from osteo-arthritis, or hypertrophic arthritis, gout, gonorrheal arthritis, and rheumatic fever.

Osteo-arthritis occurs at a later age, being uncommon before the fifth decade; but of course, true atrophic arthritis may arise in the later age groups also; and degenerative characteristics found in osteo-arthritis may be superimposed on an original rheumatoid. Osteo-arthritis is not migratory. The knees, fingers and spine are usually involved. Heberden's nodes, at the distal interphalangeal joints of the fingers, are present. The patient is in good general health. The sedimentation rate is not usually increased. The X-ray picture shows lipping and spurring of the joint margin.

Crowe describes a sign he finds of value in early recognition of osteo-arthritis; this consists of pressing patella from side to side with the limb relaxed and noting whether the cartilaginous surfaces are quite smooth or roughened. Early, there

is a faint gritty sensation apparent both to observer and patient; later coarse crepitations.

Gout is frequently diagnosed as a rheumatoid arthritis. Here there may be evidence of a gouty diathesis; blood uric acid is raised; frequently only the metatarso-phalangeal joint of the great toe is involved. Colchicum produces a remission.

Gonorrheal arthritis will in most cases be associated with a pelvic infection. A complement fixation test will aid the diagnosis.

Rheumatic fever in the older age groups may be confusing. An elongation of the P-R interval in the electro-cardiogram points to the rheumatic condition; but occasionally the diagnosis may be in doubt for some time.

Treatment

When the patient first presents herself for treatment, certain points need to be clarified between herself and the physician. It should be impressed upon her that the disease is by no means hopeless; but that its cure depends as much on herself as the doctor.

Rest and reassurance are the *sine qua non*. Regardless of varying opinions as to etiology, basic therapy consists in improving the general state of health. Fresh air, sunshine, diet adequate in all nutritional factors, protection against sudden changes in temperature and humidity, encouragement and an air of optimism are essential. Beyond this, therapeutic measures are legion.

Conservative opinion today is that focal infections should be removed in quiescent stages if they themselves are causing symptoms. Vaccines are a valuable adjuvant to treatment; for some fanatics the only major treatment. They may be mixed, or prepared from arthrotropic streptococci, and should be administered in small repeated doses. Their effect may be merely that of non-specific protein therapy. Diets of various types have been tried, including those high in vitamins A, B, C and D. Endocrines have been used.

Sulphur preparations have had a trial. Gold therapy has had a greater favour than most; intra-muscular and intra-venous injections of gold salts have been shown to be effective in many cases, albeit with some danger of toxic reactions.

Rest of the joints with the aid of plaster casts in the acute stage is necessary. As soon as the acute stage subsides, passive movement is started, followed by active movement, to prevent ankylosis.

The relative merits of the various treatments are at present a matter of opinion based on individual experience. To go into the evidence for and against each method would be exhausting both for reader and writer. However, whether science help us or fail us, we are bound to carry out an active treatment; and therapy based mainly on the infectious theory of etiology is for the present the treatment of choice.

The writer is indebted to Dr. A. A. Fletcher for his kindly help and encouragement.

The meanes to cure the Love-Foolish and Meloncholike:

"There are two ways to cure this amorous meloncholike: the one is, the enjoying of the thing beloved! the other resteth in the skill and paines of a good Phisition. As concerning the first, it is certaine that the principal cause of the disease which is this burning desire, being taken away, the diseased partie will find himselfe marvelously relieved, though notwithstanding there may remaine behinde some certaine prints and skarres in the bodie. So Erastistratus having discovered unto Seleucus the friefe of his sonne Antischus, who was like to dye for the love of his mother-in-law, saved the life of the young man: for the father having compassion upon his sonne, and seeing him in extreme perill of his life, suffered him (as being a Pagan) to enjoy the use of his owne wife.

But this course of cure being such, as neither ought nor can alwaies be put in practise, as being contrarie unto the lawes of God and men, we must have recourse unto the other which dependeth upon the industrie of the good Phisition. If therefore it happen unto any Phisition to meete with some of these meloncholike patients, thus ravished of love, hee must first of all assay to draw him with fayre words from these fond and foolish imaginations, shewing him the danger whereinto he doth cast himselfe headlong, and setting before him the examples of such as have beene overthrowne thereby as not onely losing their lives, but their soules also.

If all this doe no good, men must by some other wile, & by the setting a work of divers men, strive to make him hate that which so tormenteth him, as in affirming the thing to be evill, in calling his mistresse, light, inconstant, foolish, devoted to varietie, mocking and laughing to scorne And looke how deeply you despraise his ladie, so highly shall you praise himselfe, declaring it excellence of his understanding, his worthiness and deserts.

Removing, that is to say, the changing of the ayre, is one of the rarest remedies, because that under colour of that wee may bestowe him in some remote place, and send him quite out of the countrie: for the sight of his mistresse doth daily blow up the coles of his desire, and the only reciting of her name, serveth as a baite for his ardent affections to bite upon. It will be good for him, to lodge in the fields, or in some pleasant house; to cause him to walke often; to keepe him occupied every houre with one or other pleasant pastime; to bringe into his minde a hundred and a hundred sundrie things, to the end he may have no leisure to thinke of his love; to carrie him out a hunting; to the fenceschoole; to holde him up sometimes with fine and grave stories; sometime with pleasant tales; and therewith to have merrie musicke; you must not feede him too full or daintily, least the blood beginning to waxe hot, should rouse up the flesh and thereby renewe the olde fire."

A Discourse of the Preservation of the Sight; of Meloncholike Diseases; of Rheumes, and of Old Age.

By M. Andreas Laurentius.

Translated by Richard Surphlet

1599

(Oxford University Press)

H.B.

SLIPPED FEMORAL EPIPHYSIS

By H. H. VARTY, '41

Definition. This is a condition occurring in the proximal femoral epiphysis chiefly during the adolescent period, in which there is separation of the epiphysis from the neck of the femur with resulting displacement, and characterized clinically by pain, deformity, and limitation of movement. It is known by a number of other names—*Epiphyseal Coxa Vara*, *Epiphyseolysis*, and *Coxa Anteverta*.

Incidence. Considering disabilities of the hip as a whole it is not a common condition, but it is a fairly common cause of disability beginning in the adolescent period, to which age group it is limited. In a series of cases reviewed the age incidence varied from 10-19 years, with the average age for girls being 13 years, that for boys 15 years. The condition occurs more commonly in boys than in girls, the left hip is affected more frequently than the right, and is not infrequently bilateral. A survey of records at the Hospital for Sick Children showed:

	<i>Girls</i>	<i>Boys</i>
1929-1939	13 cases	21 cases
1939	4 cases	5 cases

Etiology

The essential factors in the production of the disease are not yet entirely clear. Since first described, many theories have been brought forward, remained popular for a time, only to fall into disfavour in the light of new clinical or pathological knowledge. Briefly these are as follows:

1. *Some abnormal conditions in the structure of the bone.* For a long time the condition was considered to be a form of adolescent rickets, in which the femur was the main or only site of involvement, the growth and development of the bone being interfered with in such a manner that separation and displacement of the epiphysis occurs aided of course by trauma. For this theory to be acceptable, it would be necessary to believe that either

rickets or osteomalacia could be localized to one or both hips leaving the rest of the skeletal system untouched. In the light of our knowledge of the rachitic process, this theory is no longer acceptable.

Others believed it to be a form of juvenile arthritis deformans in which the bones were the seat of a trophic disturbance. X-ray studies have shown that the articular surfaces of the femoral head and of the acetabulum do not participate in the process, and that any arthritic changes which may occur are purely secondary in nature following altered stress or strain in the joint, or on trauma incidental to some forms of treatment.

Frangenheim who made extensive studies of the condition, could find no evidence of rickets, but came to the conclusion that some abnormal condition existed in the epiphysiseal plate of the nature of a chondrodystrophy and that the plate slips on an already diseased plate.

Other workers believed it to be but one manifestation of a constitutional disturbance based on endocrine malfunction. In support of this, they have cited the frequency with which the condition occurs in individuals of the Frohlich type. All the endocrine glands have at some time or other been implicated, but there is no proof for this theory in the way of altered basal metabolism, blood chemistry or X-ray changes in the sella turcica.

2. *Static theory:* This postulates that the growing femoral neck is deformed and the epiphysis made to slip, by the superimposed body weight. This may in some measure be responsible in individuals in whom the body weight is disproportionate to the tensile strength of the femoral neck—e.g. Frohlich type. Whether it is the whole story or not, is not known.

3. *Traumatic theory:* This assumes that trauma is the prime factor in the etiology, and that the condition is in reality a fracture occurring at the epiphyseal

plate. It is not to be denied that trauma often initiates the symptoms of the disease, but the essential point is whether or not the upper end of the femur was normal, previous to the injury. While there is a history of trauma in the majority of cases, trauma is so common in the adolescent period and the histories so unreliable, that it is difficult or impossible to assay accurately the role of trauma. Key, to whom we owe much of our knowledge of the condition, has suggested that the periosteal fibres holding the epiphyseal plate in place, atrophy, at or about adolescence, with a resulting point of weakness along the epiphyseal line facilitating displacement of the femoral head on the application of force. This theory is accepted by most orthopaedists today.

Pathology and Pathogenesis

Owing to difficulty in obtaining specimens, especially in the early stages, knowledge of the pathology and pathogenesis has lagged far behind X-ray studies. In studies made by serial sections of the bones it has been shown, in contrast to what happens in Legge-Perthes disease, that the femoral epiphysis itself is not primarily altered. On the other hand the epiphyseal cartilage shows marked abnormalities. It may be found buckled in some places, reduplicated, fragmented or discontinuous in others, the even appearance of the normal plate being gone. The slipped epiphysis is usually found firmly united to the femoral neck but in a position of malalignment, this being variable in direction and degree. At first the articular surface is not altered and there is no evidence of necrosis of the osseous trabeculae. Near the disrupted plate there may be areas of increased vascularity, fibrous tissue, and new bone formation. Normally there seem to be 3 main factors which combine to prevent slipping:

1. Favourable tilt of the epiphysis in relation to the femoral neck.
2. Support of the head by the thick inferior buttress of the neck.

3. Anchorage of the head in the neck by the collagenous fibres linking the periosteum of the neck to the epiphyseal cartilage plate. Abnormal weight may weaken or destroy any or all of the above defences and initiate slipping. The actual mechanism of slipping may be pictured as follows: In consequence of abnormal functional stress, bunches of the fibres linking the periosteum of the neck to the plate may tear at various points. Though as yet there is no actual slipping this soon occurs as additional trauma severs the periosteal fibres completely. Subsequently there are additional changes such as fracture of the inferior buttress. Finally the activity of the muscles about the hip joint tends to separate the epiphysis completely from the neck. In the course of time union occurs in a new place, the local evidence of slipping becomes increasingly vague and the pathological picture is that of an hypertrophic arthritis.

Clinical Picture

A. History.

1. *Pain*: This is the most constant and important symptom. It varies in extent and severity. It may be localized to the involved hip or referred to the ipsilateral thigh, knee, or occasionally to the foot. In acute traumatic cases it is severe. In chronic cases it is subject to remissions and there may be a history of recurrent episodes of pain of increasing severity, until deformity results.

2. *Limp*: Usually present, is persistent and accompanied by limitation of movement. Previous to admission there is usually a long history of limping or pain or both. In one case I reviewed at the H.S.C. the patient had been treated at home for several months for "rheumatism" as the parents called it and pain had been present in the right hip for 4 months.

3. *Trauma*: In acute traumatic cases this initiates the symptoms. In others symptoms have been present before the injury. In many cases trauma seems to be relatively unimportant or absent.

Physical Examination

1. *Inspection:* It is very important to observe the patient's gait. They walk with a slight limp in which the body sways to the affected side and there is a tendency for the pelvis to sag on the affected side when weight is borne on the affected extremity. The patient stands with the affected leg rotated externally and adducted slightly. On inspection from in front the great trochanter is unusually prominent and there may be visible atrophy of the thigh muscles. Viewed from behind, the pelvis is tilted laterally and is lower on the affected side. There is a slight scoliosis with the lumbar curve to the affected side and the dorsal curve to the sound side. There may be some atrophy of the buttock on the affected side.

2. *Palpation:* There may be palpable in the groin on the affected side a hard mass which moves with the femur. This is the thickened head and neck of the femur. The hip as a rule is not tender, but pressure on the trochanter or heel may cause pain.

3. *Measurements:* (a) Great trochanter is higher than on the sound side. The tip may be 1/2-1 inch above Nelaton's line.

(b) Affected leg is shorter, measuring from the anterior superior spine to the tip of the medial malleolus, usually 3/4-1 inch. This shortening is in the femur.

(c) Atrophy of the thigh muscles, measured at corresponding points. Circumference is usually 1/2-1 inch less on the affected side.

4. *Movements:* The limb assumes a position of external rotation and adduction. There is limitation of flexion, abduction, internal rotation and hyperextension. The greatest limitation is in internal rotation and abduction. As the hip is flexed it passively rotates outward so that with 90 degrees of flexion there may be 45 degrees of external rotation. A case reviewed showed the following:

	Right	Left
Int. rotation	5°	30°
Ext. rotation	8°	50°
Abduction	20°	50°
Adduction	20°	20°

Diagnosis

This is made from history, physical examination, X-ray. Of these, X-ray is by far the most important. For purposes of description the X-ray findings may be divided as follows:

- 1. Cases showing slight slipping;
- 2. Cases showing marked slipping (a) acute, (b) chronic;
- 3. Old cases.

1. *Slight slipping:* This group comprises cases in extremely early stages where the clinical symptoms are suggestive only.

(a) Loss of the normal "hump" formed by the small projecting lip of the epiphysis and normally extending slightly beyond the superior border of the femoral neck. The lower pole of the femoral head may project below the lower border of the neck in the form of a small process or beak.

(b) Slight increase in density at the base of the epiphysis. The epiphysis remains within the acetabulum.

(c) Changes in or near the epiphyseal line: areas of osteoporosis seen as a transverse band parallel to the line or as patchy confluent zones extending into the neck. There is also an increase in the width of the line. This is due to the head and neck separating leaving a V-shaped hiatus.

(d) Femoral neck is pulled outward and somewhat upward as in a fracture of the femoral neck.

2. *Marked Slipping:*

Acute cases—history of trauma with clinical signs of a fracture.

Chronic cases—may or may not be a history of trauma, or one of repeated mild injuries.

The picture is fairly typical in both groups, the degree of deformity depending on the chronicity of the process or in acute traumatic cases on the severity of the injury.

(a) Displacement of the femoral head: It may be displaced downward in some cases, in others completely separated from the neck and lying free in the acetabular fossa.

(b) Rotation of the epiphysis: As it is detached it rotates so that its articular surface faces downwards, inwards and backwards. Its base or plate surface faces forwards and appears on the film as a circle or ellipse depending on the degree of rotation.

(c) Epiphysis may remain in the acetabulum on a plane posterior to that of the neck.

(d) Femoral neck undergoes anteversion.

3. *Old cases:* These appear identical with those of united fracture of the neck. Idiopathic and traumatic cases cannot be differentiated and in cases where proper treatment was instituted early there is little deformity to be seen.

Treatment

Various methods of treatment have been used. No one method is applicable to all cases. The type of treatment selected depends on the duration of the symptoms and the deformity.

1. *Manual reduction:* This is seldom possible in cases where symptoms have been present more than 3 months. It is identical with the method of reducing intracapsular fractures.

After treatment: A plaster cast is applied with the hip in internal rotation and 135 deg. abduction. The cast extends from the nipple to the toes on the affected side, and to the knee on the sound side. Patient is kept in the cast for 3 months and then allowed up with a walking brace. This is worn 6 months to 1 year during which time the patient receives some form of physiotherapy.

2. *Closed reduction* with insertion of a Smith-Petersen nail or bone pegs.—In cases where much shortening is present extension is applied by the Kirschner

wire method until normal length is attained. At operation a lateral incision is made over the trochanter and a Smith-Petersen nail inserted with the fragments in good position. The hip is immobilized in a cast as above for 3 months, followed by application of a Taylor brace. This is a fairly recent method of treatment and the results not well known but it seems to offer good prospects.

3. *Open reduction:* The joint is exposed from in front and a flap of capsule is reflected from its attachment to the acetabulum. The head is manipulated into its proper position, a Smith-Petersen nail inserted and the wound closed. The hip is immobilized as above for 3 months, followed by movements in bed in a wheel chair and in the tank. Later a walking brace is fitted and walking allowed. Full weight-bearing is not allowed for 6-9 months after the operation.

4. *Arthroplasty and insertion of a Vitallium cup:* One case has been treated at H.S.C. in this manner with fairly good results. Operation was performed and the cup inserted. Exercises were started in 2 weeks using a roller skating device at the foot of the bed. No pain was experienced and the patient was walking well on discharge.

5. *Treatment of residual stages*—occasionally is required to correct severe deformities.

Results

As a general rule the condition is self-limited and union invariably occurs. In untreated cases there is a permanent change in the alignment of the neck and union occurs with the fragments in malposition of varying degree. In long standing cases extreme eburnation of the articular surfaces may occur, with the formation of large osteophytes. Most cases ultimately develop an arthritis involving the acetabulum also. In cases seen early and properly treated, the end results are as a rule very good.

BASIS OF NUTRITIONAL ANEMIA IN INFANCY

By B. WINTER, '41

Anemia may be defined as a condition in which the number of circulating red blood cells or the amount of haemoglobin in a unit of circulating blood is below normal limits. It may result from defective production of cells or Hb., due to deficiency of proper building materials; deficient activity of the bone marrow; or develop in spite of a healthy bone marrow as a result of excessive destruction of red cells by haemorrhage and hemolysis.

It is a generally accepted fact that anemia states, mild or severe, are much more common in infancy and early childhood than amongst children of school age, and this preponderance may be attributed to a number of factors.

In the first place, in the newborn period, constitutional factors are dominant and extrinsic factors such as diet and infection play a relatively minor part. The activity of these constitutional or intrinsic factors is apparently demonstrated in certain children as a predisposition to the development of anemia, but this conception is considered by many observers to be merely a cloak for our ignorance of the actual mechanism concerned in the regulation of blood formation—an understanding of which would enable us to appreciate why responses in different children vary, and why one child becomes anemic while another does not, under identical conditions. With the growth of the child, these intrinsic factors are pushed into the background, and from the stage of infancy onward, extrinsic factors become progressively more active. Nutrition is one of the most important of these extrinsic factors and severe nutritional disturbances are very common. However, in any one case, nutritional, constitutional, and other factors are often so inextricably mixed up that it may be impossible to determine which is predominant in causing the clinical and hematological picture that present itself. Nutritional Anemia is a condition which arises as a result of inadequate presence in the diet or lack of utilization of elements necessary for the formation of Hb. Several such elements

exist, but the one of paramount importance is Iron and this will be considered first.

Iron Deficiency

Sherman has shown that a normal infant, whether born prematurely or at full term possesses at birth 3 times as much iron in proportion to its weight as a child over one year of age. This iron is stored chiefly in the liver and is gradually used up by the bone marrow in the production of Hb. Spectroscopic examination of a large number of humans shows copper and iron to be the only metals stored as reserve materials in the liver during foetal life. Theoretically the iron present should be sufficient to supply the need of the body until the birth weight has been tripled, and Iron deficiency anemia should not occur until after this time, even though the baby is on a purely milk diet.

Milk is extremely poor in iron. Breast milk contains less iron than is needed for normal iron metabolism, and cow's milk contains still less, and in a less available form. Furthermore, retention of iron from breast milk amounts to 74% of the intake; from cow's milk only 34%. The iron content of cow's milk is not more than 1 mgm. per litre and probably less. It is evident from this that the infant must draw from a reserve of iron in the body to meet the ordinary requirements for replacement and growth during the time that it is on a purely milk diet. This demand is filled by the body for a period lasting approximately 6 months when the prenatal store is exhausted and further failure to supply iron results in anemia.

Experimentally, young animals fed on an exclusive milk diet for an overlong period develop an anemia of iron deficiency type that can be cured by addition of iron to the milk. This experiment in itself does not, however, justify the assumption of iron lack, because many diseases are cured by the administration of specific substances that are not neces-

sarily deficient in the body, e.g. Quinine in Malaria.

It has been shown that in rats on a diet of milk alone, the total iron content of the body tends to remain relatively constant from the commencement of the diet, but the Hb. becomes reduced in proportion to the gain in body weight, resulting in a true iron deficiency anemia. But a rat triples or quadruples its weight in a few weeks and an infant cannot possibly gain weight in such a rapid manner so that the results are difficult to apply to humans. There is, however, in the human a definite relation between relative rate of growth and the severity of anemia, supporting the conception of a deficiency as the causative factor.

MacKay of London is so firmly convinced of the importance of iron deficiency that she recommends strongly routine administration of iron to all bottle fed babies, claiming not only to raise the Hb. level, and prevent, or cure anemia, but in this way also to raise resistance to infection and improve the rate of growth in the first 6 months of life. Josephs has shown that freedom from infection can have the same effect as the iron administration advocated by MacKay.

Cooley, in discussing nutritional anemia due to over long use of milk in a normal infant without proper additions, states that although this would seem to be an excellent example of the exhaustion of iron reserves, it is only arbitrarily assumed that the normal reserve has been practically exhausted by the 6th or 7th month, and that the anemia that develops is the result of iron deficiency. He states further that although there is no question that anemia is likely to develop at this time, the reason for it is open to argument. There seems to be ground for assumption that other substances essential to Hb. formation may be lacking either through faulty diet or poor assimilation. Iron is, however, the most obvious deficiency. The pyrrol nucleus for formation of Hb. has not been found deficient. Copper deficiency has not yet been proven, minute amounts being sufficient for its adequate action in catalysing Hb. formation.

Elvehjem Hart & Hohler in 1937, found furthermore after prolonged experimentation with rats that the effectiveness of whole liver in the treatment of nutritional anemia is directly proportional to its available iron and copper content. The other constituents in liver are not needed for maximal regeneration on a diet of milk and iron, with minute amounts of copper and manganese, suggesting that the importance of iron has not been over-emphasized.

Iron deficiency probably does not occur before the third month, except under abnormal conditions leading to loss of iron, such as haemorrhage, or possibly excess hemolysis. But after the third month, it becomes increasingly more important in the production of anemia, as the available evidence clearly proves.

Children of mothers anemic during pregnancy, while born with a normal Hb. may show anemia early—after three months in severe cases, and after six months in mild cases, and this anemia, it is believed by some, can be prevented by giving the mother iron during pregnancy. MacKay, in her original article, gives little evidence connecting anemia in the infant with dietetic deficiency in the mother, though probably by analogy with laboratory experimentation, a deficiency of iron in the diet of the pregnant mother predisposes to anemia in the infant.

Anemia of Prematures

A study of the anemia of prematures throws some light on the subject of nutritional anemia. Premature infants tend to become anemic towards the end of the 1st year of life, as they, by this time, may have tripled their growth rate. As a matter of fact, they are capable of quadrupling their weight in the time that a full term baby takes to little more than double its weight. There are 3 types to the anemia of the premature according to Josephs:

(a) The first type is the early physiological, occurring in the first six months; not differing from the physiological anemia of the normal full term baby, except quantitatively, and it is probably due to the same mechanism.

There is a tendency to spontaneous recovery and there is no evidence of iron deficiency in this early period. Use of liver and iron to stimulate the hemopoietic system is of no value. Repeated small blood transfusions is the method of treatment if preventative or curative measures are required to avoid probable interference with growth and development.

(b) The second type is a continuation of the above, and is characterized more by a continued rise in RBC than by further reduction of the Hb. level. In this type, recovery is slow and is not complete usually until the 2nd year of life. Reactions to liver and iron are good, and mild degrees of iron deficiency are important.

(c) The third type is a pathological one, appearing usually in the 2nd half of the first year, and belonging definitely to the iron deficiency group of alimentary anemias. It is often severe in its manifestations.

Theories as to the cause:

1. Deficient antenatal storage of iron, and perhaps copper, in the liver and spleen, resulting in early exhaustion of iron supply. Ever since the work of Bunge and Hugounenq, work which has been confirmed by others following them, it has been taught that the iron reserve is built up chiefly in the last three months of intrauterine life with a resulting insufficient supply in the prematures, due to failure in accumulation of this main store. Recently, however, Gladstone has brought forward evidence that there is no special increase in the rate of iron deposit during the last months of uterine life, but a progressively moderate deposit which is greatly augmented by the physiological hemolysis that occurs in the first days of extra-uterine life. Furthermore, MacKay has shown that by calculating the proportion of iron per kilo body weight, the same value is obtained at $4\frac{1}{2}$ to 6 months extra-uterine life, as at birth. In other words, the premature infant has a store of iron, small in absolute amount, but in proportion to body weight is little less than that of a full term baby. There-

fore, the iron stores may be considered deficient in the premature, only in relation to the relatively more rapid rate of growth and gain in weight. The anemia is due, not to deficient storage of iron before birth, but to the increased growth rate using up this store more rapidly than in a full term infant.

2. Josephs' theory regards the anemia as due to failure of the hemopoietic system to function properly during the first year of life. The main mechanism is inadequate formation of cells in proportion to the rate of growth. There is also some disturbance in adjustment between blood formation and destruction, causing a greater degree of hemolysis and a more persistent hemolysis following birth than occurs in the average full term baby. Josephs also stresses the increased susceptibility to infection in prematures, especially of the upper respiratory type, as a factor in the production of the anemia.

3. Baar looks upon the anemia of prematures as due to incomplete development of the hemopoietic system, and simply an exaggeration of the physiological state.

4. Van Creveld and Heybrock, according to Parsons, stress the importance of blood destruction rather than failure in formation, as stressed by Josephs, and regard many cases as being hemolytic in type brought about by the increased severity and the prolongation of the normal hemolysis at birth. They point out that the Icteric Index in the premature is higher and maintained higher for a longer time than in a normal full term infant.

To sum up the theories, it appears that iron storage before birth has little to do with the development of anemia in premature infants, but that it is due either to lessened formation and increased destruction of RBC as a result of inefficient function of the bone marrow, or to excessively rapid exhaustion of the prenatal store of iron as a result of the relatively more rapid rate of growth in premature babies.

Vitamin Deficiency

Association of anemia with disease due to vitamin deficiency is a frequent observation, but the relation is not definite or settled. In the feeding of infants, diets deficient in one vitamin are usually deficient in others as well as in iron. And in ordinary times vitamin deficiency is usually encountered in poorly nourished infants in whom anemia is likely to be present beforehand. Premature babies and twins are particularly liable to both anemia and vitamin deficiency. These also occur together in chronic G.I. diseases, the lack of proper absorption of food products probably being the underlying cause of both conditions. The anemia is ordinarily of the hypochromic type and readily cured with large doses of iron.

Vitamin deficiency may predispose to infection and be indirectly the cause of anemia, or, on the other hand, an infection may make a latent deficiency clinically active and at the same time precipitate an anemia. Cooley states that it is not generally believed that there is any demonstrable connection between any of the avitaminoses and a definite type of anemia. However, it is notable that when these occur together the anemia may be cured by measures taken for treatment of the deficiency without definite anti-anemia therapy.

Certain observers believe that at least two vitamins are related to the normal maturation process of RBC formation. These are Vitamin B₂ and Vitamin C.

Consider Vitamin B₂. Castle has recently summed up the evidence for the relation of Vitamin B₂ and the macrocytic anemia of sprue, pregnancy, and coeliac disease reaching the conclusion that while there was an association between the extrinsic factor which goes to form the anti-anemia principle and Vitamin B₂, there was no proof of identity. Parsons has obtained striking results in nutritional anemia of rats with Vitamin B₂, but cor-

responding results have not been obtained with children. In pellagra, anemia may occur but is caused by failure to absorb properly due to chronic G.I. disturbances, associated with the disease.

Consider Vitamin C. Deficiency of Vitamin C experimentally can cause an anemia which is specific in the sense that there occurs a rise in reticulocytes and rapid return to normal of RBC and Hb. after the administration of orange juice alone. However, in the majority of cases in infants in which both scurvy and anemia are present, orange juice has no such effect and the anemia is cured in the usual way by adequate dosage with iron. If Vitamin C is necessary to complete maturation of the RBC, as Witts claims, it is difficult to account for the lack of specific anemia in cases in which Vitamin C deficiency is evidently present without anemia. Furthermore, the fact that Vitamin C is capable of causing specific damage to the bone forming tissues, does not account for the great majority of cases in infants in which there is no such specific damage.

An excellent example of nutritional anemia in infancy is available in a study of the Douk-habor infants of British Columbia as reported to Dr. Couch of the Toronto General Hospital by Dr. Daly of Trail, B.C. These infants are apparently fed entirely on their mothers breast milk until well up to 2 years of age, so that otherwise available sources of iron and nutritional essentials are denied to them. Over this age they live on vegetables only, since they do not believe in eating meat. The result is usually a severe degree of anemia with haemoglobin content frequently as low as 15% before adequate therapy is instituted. The fact that these cases commonly recover on iron therapy is testimony that treatment with iron is effective in causing recovery from the most severe grades of nutritional anemia.

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HEMOPTYSIS

By W. F. JONES, '42

Literally, the term hemoptysis means "blood-spitting", but clinically it is restricted to expectoration of blood derived from the lungs, bronchi, trachea, and larynx—to the exclusion of blood from the mouth, nose or pharynx.

The differential diagnosis resolves itself into two main parts:

I—A determination of whether the symptom has really been hemoptysis in the restricted sense, or whether the blood has been derived from the mouth, nose, or pharynx on the one hand, or from the stomach on the other; and

II—If true hemoptysis has really occurred, a determination of its exact cause in the particular case at hand.

Distinction Between True and Spurious Hemoptysis

True hemoptysis, that is, hemorrhage from lungs, bronchi, trachea or larynx, can sometimes be distinguished at once from the spitting of blood derived from the nose, mouth or pharynx. The occurrence of epistaxis, bleeding gums, tonsillitis, ulcerative stomatitis, carcinoma of tongue or lip, injury to the mouth or nose, gingivitis, dental caries, pyorrhoea, pharyngitis, and acute inflammation of the antrum of Highmore or frontal, sphenoidal or ethmoidal air sinuses, may generally be detected by a careful examination of the nose, mouth, gums, and pharynx. Also the blood in these conditions is usually mixed with saliva and watery.

It is very important, however, to be decidedly guarded in concluding that blood is not coming from the lungs; and a careful examination of the patient's sputum for tubercle bacilli and an X-ray of the lungs should be carried out in every case, lest an early stage pulmonary tuberculosis be missed.

The distinction between hemoptysis and hematemesis is often easy, but sometimes very difficult; the following is a summary of the points of distinction:

Hemoptysis:

1. The patient coughs the blood up.
2. Part of the blood is often frothy.
3. Blood may occur by itself, or mixed with the sputa and recognizable microscopically.
4. The blood is alkaline.
5. Acid-fast organisms or elastic fibres may be detected.
6. There may be a previous history of acute rheumatism, or of cough and night sweats, indicative of heart or lung disease and confirmed by physical examination.
7. Before the blood is coughed up, there is often a sense of tickling or gurgling in the throat, always suggestive of true hemorrhage.
8. The stool is not altered afterwards unless an abundance of blood has been swallowed.
9. Blood-stained sputa may be expectorated for several days after a severe attack.
10. A history of cough.

Hematemesis:

1. The blood is vomited.
2. The blood is not frothy.
3. Blood may occur by itself but is often mixed with vomitus recognizable by food particles.
4. The blood may be alkaline if abundant, but acid from admixture with acid gastric juice.
5. Tubercle bacilli will be absent.
6. There may be a definite history, with or without physical signs, pointing to a gastric lesion or to portal obstruction, e.g. cirrhosis.
7. Before the blood is brought up there may be a feeling of sickness, nausea, epigastric uneasiness, faintness and giddiness.

8. The stool is often black and tarry afterwards.

9. There are usually no sputa.

10. A history of abdominal pains after food.

Even with these points of distinction one may be misled unless the patient can be kept under observation for a time; for example, hematemesis may be caused by hemoptysis, especially when the hemorrhage occurs during the night and the patient swallows the blood unconsciously. Usually, however, the incidence of bleeding excites coughing and the patient awakes. Also, redness of the sputum is not always proof that the colour is due to blood; apply the benzenedene test and look for blood microscopically in the sputum for confirmation.

Determination of the Cause of Hemoptysis

For a fuller account of this the reader is referred to French's tables of the causes of hemoptysis.

A—*Hemoptysis due to changes in the Lungs:*

1. Tuberculosis.
2. Mitral Stenosis.
3. Acute Lobar pneumonia.
4. Infarction of lung (either embolic or thrombotic).
5. Injuries, e.g. fractured rib.
6. Other causes as neoplasm, actinomycosis, pneumoconiosis, empyema bursting through lung, hepatic abscess passing into lung through diaphragm, etc.

B—*Hemoptysis due to changes in Bronchioles, Bronchi or Trachea:*

1. Bronchiectasis.
2. Ulceration of the trachea or bronchus due to neoplasm, pressure of a tuberculous lymph node, aortic aneurysm, etc.
3. Bronchitis.

4. Irritant gases, e.g. chlorine.

C—*Hemoptysis due to changes in the Larynx:*

1. Acute laryngitis.
2. Ulceration, e.g. tuberculous, syphilitic, neoplasm, etc.
3. Injury to larynx, e.g. a blow.

D—*Hemoptysis due to changes in the blood:*

True hemoptysis may rarely occur in purpura, scurvy, leukemia, pernicious anemia, hemophilia, etc.

E—*Doubtful causes of Hemoptysis:*

1. Hemoptysis in apparently sound and healthy normal young patients.
2. Other conditions as vicarious menstruation, second stage of glomerulo nephritis, recurrent hemoptysis of some arthritics, etc.

There are some causes of hemoptysis in the above list about which little need be said. The whole of group E is open to much doubt, while causes in group D seldom give rise to extensive true hemoptysis, though there may be much epistaxis, bleeding from gums and so on. Copious hemoptysis has only two causes, namely, rupture of an aortic aneurysm into lung, bronchus or trachea (this latter rarely); and rupture of an aneurysm of a pulmonary arteriole into a lung cavity, for example in tuberculosis with cavitation.

Pathogenesis

Briefly now we shall discuss the mode of production of the symptom with special reference to three of its most important causes, namely, pulmonary tuberculosis, mitral stenosis, and acute lobar pneumonia. Other examples the reader may supply for himself for the diagnostic and prognostic significance of hemoptysis can only be appreciated when one has a clear understanding of the anatomical changes responsible for the bleeding.

1. *Pulmonary Tuberculosis.*

Here the frequency of the symptom varies very greatly. Fishberg states that it occurs in from 25-80% of cases although a large proportion of cases of pulmonary tuberculosis terminate in recovery or death without any hemoptysis.

Pathologically there are three main pulmonary lesions which will produce hemoptysis in pulmonary tuberculosis, namely, local inflammatory or active hyperaemia, ulceration and erosion of a blood vessel, and aneurysmal dilatation of blood vessels. The initial hemoptyses are said to be caused merely by localized active inflammatory hyperaemia of pulmonary parenchyma, which bleeding may be profuse or merely blood streaked sputum is coughed up. But the amount of blood coughed up is no criterion of the amount produced for quite a bit is absorbed from lungs and bronchi. Thus it is important to note that if the hemorrhage is not profuse we must not conclude that the case is mild or that the lesion is not extensive.

When the lesion progresses from infiltration to caseation, softening and liquefaction, associated blood vessels become ulcerated. But because of the strong tendency to the formation of thrombi in the affected vessels, excepting in very acute stages, hemorrhages do not occur as often as one might expect from the destructive lesions produced. In chronic cases there usually occurs a narrowing or complete obliteration of the vessel by growing tubercles which when finally ulcerating may leave an erosion through which blood can flow more or less freely until it is occluded by a thrombus. Also the increased blood pressure at the infected and inflamed areas dilates the softened vessels and causes small sacculated aneurysms of Rasmussen.

Most cases of hemorrhage usually end in recovery and the pathological changes in lung at the time of bleeding can only be surmised, but fatal cases of hemorrhage at autopsy usually show that the source of bleeding was an exposed vessel laid bare by the loss of the supporting perivascular parenchyma, and erosions of adventitia and media lead to aneurysmal dilations of the intima which gives way.

In the more acute stages of tuberculosis, the hemorrhage usually comes from ulceration of large pulmonary vessels and may be fatal at once. Here there is no time for the narrowing of blood vessels to occur, thus preparing it so that in case of rupture, it may easily be repaired by occlusion with a thrombus which saves the majority of chronic tuberculosis individuals from death due to this cause.

2. *Mitral Stenosis.*

Mitral stenosis is the second commonest cause of hemoptysis. Because of the chronic venous congestion resulting from it and the increase in pulmonary venous pressure, distended pulmonary capillaries may rupture into alveoli producing hemoptysis. Also emboli originating in a thrombus in the right auricle or in the leg readily result in infarction in an unhealthy lung made thus by the impaired circulation, but not so in a healthy lung because of the abundant anastomotic circulation. The microscopic appearance of an infarct with its alveoli stuffed with blood due to necrosis of alveolar walls, makes the presence of blood in the sputum easy to understand.

3. *Acute Lobar Pneumonia.*

The characteristic rusty, tenacious, stringy sputum produced here is easily understood from the underlying pathology. Due to the pneumococcal irritation, the essential lesion in the lung is an alveolar inflammatory exudate. The alveoli are filled with an acute inflammatory exudate consisting mainly of polymorphonuclear leucocytes and fibrin with many red cells and of course the capsulated pneumococci. All these cells and fibrin pass out from the congested, swollen capillaries. The sputum is stringy and tenacious because of its high fibrinous content.

And in conclusion, a careful examination of the patient's sputum and an X-ray of the lungs should be carried out in every case lest an early stage pulmonary tuberculosis be missed. For example, acute lobar pneumonia may obscure an accompanying tuberculosis unless such is done.

CONGENITAL SYPHILIS

By JEAN MEINERS, B.A., '41

Many great names are associated with the development of congenital syphilis as a clinical entity. The hereditary nature of syphilis was recognized as early as the beginning of the sixteenth century by Paracelsus and Paré. However the great John Hunter denied the possibility of its existence, and it was only finally established by the work of Colles, Hutchinson and others.

Etiology and Transmission

Until a few years ago it was considered possible that the father could infect the child directly by spermatazoa carrying the etiological agent, *Treponema pallidum*, to the ovum. Even if the ovum were infected thus, surely the only result could be immediate death of the ovum since foetal tissues have no immunity to infection with the spirochaete.

The practically universally accepted view to-day is that congenital syphilis can occur only through an infected mother, and this only after conception either by the carrying of the organisms by the blood through the placenta, or by infection from a diseased placenta, or finally by direct contact with syphilitic lesions of the maternal birth canal or genitals at the time of birth.

The time at which the foetus may become infected depends on the time of infection in the mother and the severity of her infection. However the spirochaeta *pallida* has not been observed in the foetus before the fifth or at the earliest the fourth month of pregnancy. The mother then must be first infected, and by the placental route the disease is transmitted to the foetus. Not every syphilitic mother will transfer the disease to her unborn child for the level of spirochaetes in the maternal blood stream is not constant, but there are showers of organisms liberated from time to time which if coincident with a pregnancy will almost certainly infect the baby. However as long as a syphil-

itic woman is capable of conceiving there is the possibility of a syphilitic child if she receives no treatment.

What is known as syphilis in the third generation is an established and interesting fact. In this case there may be some suspicion of syphilis in a maternal grandparent, but perhaps no evidence in the child's immediate parents. However Wassermann tests will usually reveal that the mother is also a congenital syphilitic, and although showing no signs of the disease herself is capable of transmitting the disease to her child.

That congenital syphilis is contagious is conclusively shown by the fact that a syphilitic baby may infect a healthy wet-nurse. However such examples are rare, and certainly after the open lesions such as bullae, rash, moist patches, etc., have healed there is no danger of infection other than that of the foetus by its congenitally syphilitic mother.

Pathology

Like acquired syphilis the congenital form may affect all of the organ systems. Probably the only lesion not demonstrable in hereditary syphilis is the primary chancre which occurs only occasionally as the result of infection while passing through the birth canal.

The syphilitic placenta is larger than usual, and has thickened, hyperplastic, but avascular villi. At autopsy the spirochaetes are observed in large numbers in the liver, spleen, kidneys, adrenals, heart muscle, bone marrow and testis. Diffuse fibrosis is seen in the various organs, particularly the lungs, pancreas, heart and adrenals.

Probably the lesion most uniformly present is an epiphyseal osteochondritis or Wegner's disease, recognized even before birth by X-ray. The line of ossification at the end of a long bone instead of being a thin, regular, pearly gray line is an irregular, thickened, zigzag, yellowish band. Periostitis may also occur, and in late congenital

syphilis a diffuse osteitis of the tibiae results in "saber shins". Later also there is a tendency to gummas involving various bones—nasal, hard palate, cranium, and inner end of clavicle.

In the foetus or newborn infant the liver is probably the organ most frequently involved. It is large and firm from a marked increase of the connective tissue elements and miliary gummata may appear later. The spleen is enlarged from fibrous tissue increase and lymphocytic infiltration.

In the respiratory system the possible lesions are several—early rhinitis and laryngitis, a late ulceration of the nasal septum, and in the lung itself a condition known as the white pneumonia of Virchow.

The action of the spirochaete during the formation of the permanent dentition results in the characteristic malformation of the upper central incisors—the teeth become peg-shaped and have a notched free border—the so-called Hutchinson's teeth.

In the central nervous system syphilis may affect the meninges, the blood vessels or the brain itself producing such conditions as meningitis, encephalitis, hemiplegia, paresis, and tabes.

Involvement of the organs of special sense is also not infrequent. An otitis may arise in early congenital syphilis secondary to the pharyngitis, and leave the child with reduced hearing. Later at about the time of puberty a true nerve deafness may appear due to involvement of the eighth nerve by the syphilitic process. In the eye iritis and interstitial keratitis are the commonest lesions.

Clinical Picture

Early manifestations

Symptoms are present at birth in living children in only a small number of cases. In such there is usually a severe degree of infection and the infant does not live more than a few days. He resembles a "little, old man", being small, wizened, thin and weak. Snuffles, hoarse cry, symptoms of central nervous system involvement, syphilitic pemphigus on palms and soles, haemorrhages

from nose and bowel may all be present.

However in the great majority of cases the infant appears healthy at birth, and after a variable latent period, usually at least three to four weeks, begins to show symptoms of syphilis. Generally the first symptom is the snuffles which resembles an ordinary cold in the head except that it persists. About one week after the appearance of snuffles an eruption is usually noticed, maculopapular in character, rarely bullous or pustular, and seen first on the hands, feet and face. Among the best diagnostic features of early congenital syphilis are the fissures and raised white mucous patches. The fissures seen about the mouth and anus are really linear ulcers which later heal to yield radiating scars known as rhagades. General examination will usually reveal an enlarged liver, even down to the level of the umbilicus, and occasionally accompanied by an enlarged spleen.

Disease of the bones resulting in pain occurs in a fair percentage of cases. Due to the pain the child cries when handled or holds the limb as if it were paralysed—this is Parrot's pseudoparalysis. X-ray examination will show the characteristic changes in the epiphyseal region.

The child may suffer from convulsions or have a true paraplegia; exhibit a bulging fontanelle, or stiffness of the neck with a positive Kernig's sign, symptoms very suggestive of meningitis but with no febrile reaction. Lumbar puncture will reveal the true state of affairs.

Late congenital syphilis

In this so-called syphilis hereditaria tarde, the symptoms may come on at any period during childhood or about the time of puberty, but rarely later. They are seen both in those who have had the usual symptoms of congenital syphilis in early infancy, and in others where the most careful examination into the history fails to disclose any symptoms whatever of early syphilis.

Late congenital syphilis shows itself by symptoms which in the acquired disease would be classed as tertiary. The three classical symptoms of the

period are referred to as Hutchinson's triad—interstitial keratitis, Hutchinson's teeth, and eighth nerve deafness, and any one or more of these may be present. The usual involvement of bones at this stage is a diffuse osteoperiostitis resulting in the case of the tibiae of the characteristic deformity known as saber shins, and accompanied by nocturnal pain and tenderness. Gummatous periostitis may yield nodes on the cranium, and ulceration of the nasal bones resulting in saddle nose. Enlargement of the lymph nodes is frequently noted, the enlargement of the epitrochlears being particularly diagnostic. General signs also present themselves—undersize, delayed development, anemia, and mental retardation. Disease of the central nervous system may result in paralysis, Argyll-Robertson pupils, strabismus, sudden deafness, optic atrophy, juvenile paresis and tabes.

Diagnosis

The diagnosis of congenital syphilis depends upon the history, clinical symptoms, and laboratory findings of the individual himself and upon similar evidence in his parents, brothers and sisters, although as with acquired syphilis the diagnosis occasionally must rest on the results of therapeutic measures.

Diagnosis in early congenital syphilis

In a child born with active manifestation of the disease as described under the symptomatology, there is usually little difficulty in making a correct diagnosis from the clinical findings alone, but it should be corroborated by a Wassermann test.

If the child is born apparently healthy, as is usually the case, the establishment of a diagnosis is more difficult. However a combination of two or more symptoms such as snuffles, typical eruption, enlargement of epitrochlear glands, early enlargement of the spleen, apparent paralysis, and failure to thrive, aid in arriving at a diagnosis of congenital syphilis.

Examination of the exudate from the rhinitis, moist papules, bullae, etc., by darkfield or the India ink method may

reveal the presence of spirochaetes and clinch the diagnosis.

The Wassermann reaction is of great value in children over three months. In congenital syphilis a positive reaction is seldom absent, but before three months of age the findings are not conclusive. A non-syphilitic child may exhibit a positive blood Wassermann at birth which only later becomes negative; this is thought to be due to the transfer of syphilitic reagin from the blood of the mother to the blood of the foetus without actual infection. On the contrary a child may show a negative reaction at birth only to become positive in a few months. This state of affairs makes quantitative Wassermann tests important since a gradual increase is found where the child is actually syphilitic and vice versa.

In the case of central nervous system symptoms such as convulsions a cerebrospinal fluid examination will frequently reveal the diagnosis of syphilis. There is a slight increase in the cells and globulin content of the spinal fluid, and the Wassermann and colloidal gold tests are positive.

Another aid to diagnosis in early syphilis is X-ray examination of the bones showing thickening and irregularity of the epiphyseal line, and differentiating such other painful bone conditions as osteomyelitis, scurvy and fracture.

Diagnosis of late congenital syphilis

This is based on the clinical signs and symptoms—interstitial keratitis, sudden deafness, Hutchinson's teeth, enlarged epitrochlear glands, bone changes, saddle nose, hemiplegia, and rarely paresis and tabes, and the Wassermann reaction which is positive in ninety per cent of cases of late congenital syphilis.

Prognosis

The prognosis in an individual case depends on whether the mother has been treated during her pregnancy, upon the age at which the symptoms develop, the time when treatment is begun, its thoroughness and upon the surroundings and mode of nourishment of the child. The outlook is better the

longer after birth the first symptoms appear, and is better in infants who are nursed than in those who are artificially fed. In these days of routine Wassermann examination in prenatal clinics the child's chances are immensely improved since it may be stated with authority that if the mother is treated from the fifth month of her pregnancy to delivery the child will escape the disease. If born with active signs and symptoms of the disease the child dies no matter what treatment is instituted. Treatment started after lesions appear in early syphilis soon clears up the external manifestations of the disease, but unless this treatment is adequate, and the Wassermann reaction becomes and remains negative, there is every possibility that the child will develop symptoms of syphilis hereditaria tarde later. However adequate treatment means that the child becomes and remains well. In early neurosyphilis where a positive Wassermann reaction in the cerebrospinal fluid is the only neurological finding, the prognosis is good with active treatment, but after the symptoms have been present for any length of time it is very poor.

Prevention

No infected person should be allowed to marry until he or she has undergone treatment, and the Wassermann reaction has remained negative for two years.

The mother should be treated during her pregnancy if she has ever previously shown signs of the disease, if her Wassermann reaction is positive, or if the father is known to be syphilitic whether the mother has symptoms or not.

Treatment

The prenatal treatment of the mother is probably the most important feature. A course of bismuth and arsenical therapy for as long as possible during the pregnancy and extending for some weeks into the nursing period is recommended.

No matter how rigorously the mother has been treated the child should be regarded as suspect, and darkfield ex-

amination of cord scrapings, Wassermann tests, and X-ray investigation of bones should all be performed. If all of the above examinations are negative the child should be seen monthly until six months of age, and then less frequently up till two years when if all tests are still negative treatment is not needed.

Treatment of child

When congenital syphilis is diagnosed on clinical or serological grounds treatment should start immediately. If at all possible the child should be breast fed by its own mother to ensure the best possible nutrition.

Specific treatment consists of mercury inunctions and administration of one of the arsenicals. The mercury is administered as undiluted unguentum hydrargyri, a piece the size of a pea, bean, or grape, depending on the size of the child, being rubbed into a different skin area each day of the week.

Small infants usually tolerate intravenous administration of arsenicals poorly, and also their veins are difficult to inject, so that they may be started on an arsenical compound which can be given by mouth, namely, Acetarzone. Thus as soon as a diagnosis of syphilis is made this drug is commenced as follows:

$\frac{1}{4}$ tablet (0.025 gm.) once a day for seven days.

$\frac{1}{4}$ tablet—b.i.d., for seven days.

$\frac{1}{4}$ tablet—t.i.d., for 8 to 10 weeks.

Then a rest period for four to six weeks, and then the course of Acetarzone is repeated. Mercury should be continued during the first course of Acetarzone and during the rest period.

As soon as the infant appears strong enough and the veins are readily entered the Acetarzone by mouth should be replaced by intravenous administration of an arsenical, preferably Neoarsphenamine or Mapharsen.

Dosage:

Neoarsphenamine—0.1 to 0.2 gm./wk. up to one year of age.

Mapharsen—0.01 to 0.04 gm./wk.

The routine usually followed is a weekly injection of arsenical for six weeks

followed by six weeks of mercury inunction plus Hydrargyrum cum Creta— $\frac{1}{4}$ to $\frac{1}{2}$ gr., t.i.d., by mouth, and then a Wassermann taken. These twelve week courses are continued until the Wassermann is negative, and then the mercury alone is continued at intervals until the Wassermann reaction has remained negative for one year.

In older children the treatment is similar to that for adults—fifteen to twenty weekly injections of an arsenical (Neoarsphenamine—0.3 to 0.45 gm./wk.), followed by twelve weekly injections of bismuth (Bisoxyl—0.1 to 2.0 cc./wk.). The urine should be checked for albumin and casts as evidence of

toxicity after each injection. A change in the arsenical used often aids in reversing the serology. In late congenital syphilis with evidence of gummatous change iodides in a dosage of 3 to 7 gr., t.i.d. may be of value.

Not only the child in question but the whole family should be treated and carefully followed up if we hope to prevent any further cases of congenital syphilis in that family. We must anticipate the day when all maternal syphilis will be diagnosed early and treated thoroughly so that prenatal syphilis like other preventable diseases becomes a thing of the past.

*“Tis easier to preserve than to recover Health,
to prevent than to cure Disease”*

“It is a common saying, that every man past Forty is either a Fool or a Physician: It might have been as justly added, that he was a Divine too: For, as the world goes at present, there is not any thing that the Generality of the better Sort of mankind, so lavishly and so unconcernedly, throw away as Health, except eternal Felicity. Most men know when they are ill, but very few when they are well. And yet it is most certain, that 'tis easier to preserve Health than to recover it, and to prevent Diseases than to cure them. Towards the first, the means are mostly in our own Power: Little else is required than to bear and forbear. But towards the latter, the means are perplexed and uncertain; and for the Knowledge of them the far greatest Part of Mankind must apply to others, of whose skill and Honesty they are in a great measure ignorant, and the Benefit of whose Art they can but conditionally and precariously obtain.

An Essay of Health and Long Life

By George Cheyne, M.D.

London.—Printed at the Golden Ball over-
against the Royal Exchange. 1725.

Medical Society Notes

By J. B. ARMSTRONG, '43

The Medical Society Executive 1940-41

President.....W. E. Ortved
 Vice-President.....G. A. Gould
 Secretary-Treasurer.....J. B. Armstrong
 Asst. Secretary-Treasurer.....W. G. Burrows
 President, Sixth Year.....A. J. Denne
 President, Fifth Year.....J. H. Fraser
 President, Fourth Year.....L. E. Mottram
 President, Third Year.....J. F. Murray
 President, Second Year.....W. G. Beattie
 President, First Year.....R. A. Crompton
 Editor-in-Chief, Medical Journal....T. S. Wilson
 Chairman, Daffydil Committee.....T. H. Black
 President, M.W.U.A.....Miss A. E. Whiteside
 President, Athletic Association..M. P. Townsend

The Medical Society Executive is a group, elected in the spring, to direct student activities in this faculty, for the following year. It is the medical "Students' Administrative Council."

* * *

The executive in behalf of the medical student body wishes to welcome all who this year have chosen to study with us. Particularly do we wish freshmen every success in this, their most important year.

* * *

The initiation of first year on October 2, ended in a rather novel way, but it was quite successful and will not readily be forgotten by those concerned.

* * *

The executive wishes to express for the whole society, sincere congratulations to those of this school who passed the Primary Examination of the Royal College of Physicians and Surgeons of Canada. The successful candidates this fall were: Miss J. H. Montgomery, Dr. J. W. McNichol, and Messrs. R. G. Bell and D. B. Stark.

* * *

The Annual Medical At-Home will be held Friday, January 31, at the Royal York Hotel. Mart Kenney's orchestra has been engaged for the occasion.

* * *

The Soph-Frosh dance, held this year at Hart House, was a splendid party and those in charge deserve hearty congratulation. May we mention in particular Messrs. Gord Beattie and Bob Crompton.

The Medical Banquet certainly deserves to become an annual affair. It was a grand party enjoyed by all. The guest of honour was Brigadier Eric Haldenby who was graduated from this university. He described the experiences of his battalion in England, including a brief but hectic visit to France. The chairman and manager, Mr. Grant Gould, deserves special commendation on his great effort.

* * *

The executive regrets that there have been no open meetings so far this year: we have met with great difficulty in the selection of an hour suitable to all years. At the first open meeting a tentative budget was to have been discussed. This budget is printed below.

THE BUDGET

Medical Society Executive 1940-41

750 students @ \$4.00	\$3,000.00
Journal, \$1.00 per student	750.00
Athletic, \$1.50 per student	1,125.00
Med. Society, \$1.50 per student	1,125.00
M.W.U.A.	150.00
Graduation Banquet	125.00
C.A.M.S.I.	70.00
Banquet	250.00
Christmas donation	60.00
Medical At-Home	
Daffydil	
Soph-Frosh	
S.A.C.	25.00
Bursary	
Telephone	15.00
Caretaker	5.00
Printing	45.00
Keys	70.00
Trips—	
Kingston	\$27.50
Montreal	40.00
London	22.50
Guelph	15.00
	105.00
Photographs	42.50
Audit	20.00
Sundries	5.00
	———— \$987.50

Medical Athletics

By M. F. CLARKSON, '43, Secy-Treas.

The officers of the Medical Athletic Association are as follows:

President.....M. P. Townsend
Vice-President.....D. R. Clark
Secretary-Treasurer.....M. F. Clarkson
Third Year Rep.....Peter Turner
Second Year Rep.....John Cole
First Year Rep.....Lloyd Wright
Quartermaster.....Page Statten

For the benefit of the Freshmen the purpose and the workings of Medical Athletic Association are here summarized. The President, the Vice-President and the Secretary-Treasurer are elected by the whole Faculty at the annual elections, from the Sixth, Fifth and the Fourth Years respectively. The three junior members are elected by their Years alone. Each member of the Association has a vote in any business at the regular meetings held each week throughout the year. The Association organizes Medical athletics, appoints team managers, obtains coaches and authorizes the purchases of the appointed Quartermaster for required equipment. As each member of the Faculty pays \$1.50 to the Association in support of athletics, every member should turn out to all the sports that he possibly can. Also there is a trophy awarded by T. A. Reed and is known as the

(*T. A. Reed Intramural Trophy*) which is awarded annually to the Faculty or affiliated College which obtains the highest points for participation in athletic competition. Points are awarded according to the number of students turning out and also extra points for winning a championship. As there is no Intercollegiate sport this year the athletic spot-light rests more than ever on the Intramural sports and therefore it is all important that every man should turn out for at least one sport.

The Athletic Association awards an "M" to any man fulfilling the following requirements:

1. A first "T" holder.
2. A member of an interfaculty championship team.
3. Three years participation in any interfaculty sport.

So far this year there seems to be a feeling that there is no time for sports because of the Military Training, but if you really think the situation over carefully you will see that there is ample time to take part in at least one sport. If we all put our backs to the wheel this year there is no reason why the Faculty of Medicine should not carry off the T. A. Reed Trophy.

Book Review

Let's Talk about Your Baby. By H. Kent Tennery Jr., M.D. *The University of Minnesota Press, Minneapolis, Minn., 1940. 111 pages. Price \$1.00.*

THIS is a most unusual little book. It gives detailed information and direction regarding the care of the child during the first year of life but does so in a very unorthodox and novel fashion. The doctor, mother and child are pictured as trio working together to the solution of a common problem, the normal development of the third party. The mother's questions, the doctor's advice, and the child's reactions are cleverly knit into a form which is interesting and entertaining without sacrificing factual

value. This departure from stereotyped style is well designed to reassure as well as hold the attention of young mothers, for whom it is obviously intended. Clothing, furniture, feedings, teething, infectious disease, and all the many other problems which present themselves are dealt with in a simple, understandable fashion which leaves little to be desired. The author wishes parents to enjoy the delights of infant care and development by averting the attendant worries and pitfalls, and has undoubtedly shown the way to accomplish this. The book should prove extremely popular and useful and Dr. Tennery is to be congratulated on the originality of its preparation.

F. O. Wishart

Feature Section

ALAN VAUGHAN, Editor

WOMEN'S PLACE IN MEDICINE

By JESSIE GRAY, B.A., M.D., M.S.

Fellow in Surgery, University of Toronto

The very title of this article, to my mind, leaves an erroneous impression, because it implies that women are especially equipped to act in only certain localized departments of medicine, and are inherently handicapped in the remaining fields. This, of course, except in a very broad way and to a very slight degree is absurd. However, I was not consulted about the title of the subject upon which I was requested to write. And so it stands. But how one would laugh at an article entitled "Men's Place in Medicine". The title, "Women's Place in Medicine" is just as ludicrous if you see it through the eyes of the average normally aggressive Medette.

We will now proceed to contradict ourselves by admitting that there may be certain branches of Medicine in which we do not shine with our accustomed brilliance. For example, I doubt if even the most militant suffragette among us would deny that genito urinary surgery is no place for a woman. Probably eighty per cent. of genito urinary practice is confined to men. And until there is a radical change in the basic psychology of human nature it will continue to prove highly embarrassing for the average patient and even, we might admit, somewhat trying for the usual woman doctor, if she essayed to set herself up as a urologist. There is, however, no reason why a certain per centage of women should not acquire a training in genito urinary conditions to be applied in practice among women patients and hence best linked gynaecology. I know that I am laying myself open to criticism from among our own ranks in adopting this attitude. There will be some bolder spirits who will claim that it is no more

absurd for women to be urologists than it is for men to be gynaecologists. But I must admit that I am still a little more mid-Victorian than that. It seems to me that there are certain basic differences in the psychological make-up of the male and female of the species which it is best just tacitly to accept and allow the psychologists to continue the discussion. And these differences account for the possibility of a man being a gynaecologist and the impossibility of a woman being a urologist.

Now to proceed from the scene of our most ignominious defeat to that of our most outstanding success. There is no doubt about it that women are signally well suited to the practice of obstetrics and gynaecology. In this field, of course, as in all others, we still have to struggle against a certain retarded element of the feminine public. There is a prejudiced class among women which still titters and says, "Oh, but I just couldn't have quite the same confidence in a woman". But with increasing education and pride in the achievements of members of their own sex in all professions, this backward minority is being slowly but surely weeded out. And to counter balance this small stumbling block, in obstetrics and gynaecology women doctors enjoy the unique advantage of being able to understand and sympathize with many of the patients, symptoms and complaints in a way that a mere male could never hope to do. In the past many a patient has dragged herself about for years with a gynaecological condition about which she has never been able to summon up the fortitude to overcome her innate modesty—false modesty, if you will—and consult a man doctor. To such women

—fortunately for us, fairly common—the advent into the field of medicine of increasing numbers of women practitioners has been a blessing indeed. What woman would not rather have a woman than a man doctor deliver her of a baby, would not rather consult a woman than a man about such intimate complaints as dysmenorrhoea, sterility, dyspareunia, prolapse and menorrhagia?

There are, of course, many other fields of medicine in which women have done particularly outstanding work. But the fact which I would like to emphasize is that there is practically no branch of the medical profession in which some woman or women have not distinguished themselves. This is a most encouraging circumstance because what has been done, can and will be done again, and more and more frequently.

Times have changed greatly from the still quite recent days when women had to argue, demand, cajole, threaten and plead their way into our medical schools. Every conceivable obstacle was placed in the way of those pioneers to whom all modern women medicos owe so much. But though our path today is so much easier, it is still no bed of roses. Beginning right in the home, a much larger percentage of girls than boys encounter parental opposition to their entering medicine. The father will object that he has not the money to spend on a medical education for Mary, who will probably just get married anyway and never use it; though he would be delighted if John expressed a desire to become a doctor. And the mother will complain that it would be too hard work, and that Mary would be much better off to marry young as she did than to be spending years in smelly laboratories and investigating such unladylike things as human anatomy, physiology and pathology.

Having overcome these minor obstructions, our young heroine enters the medical school. Here she immediately encounters the snubs of at least one professor who ostentatiously addresses his class as "Gentlemen!" The men in her year look upon her at first with slightly amused curiosity or thinly veiled

disdain, or a patronizing condescension. Later this changes to bored indifference. Let her distinguish herself in the class in any way and she immediately becomes the object of poorly concealed hostility. I am, of course, purposely painting a very black picture. Needless to say, there are, in every class in medicine, a number of men who accept their female fellow students as equals and treat them in all fairness, just as they would any other member of the class. And an even bigger percentage, of course, are hardly aware that there are women in the class, accept them without demur and never think about them one way or another thereafter. But to make my point I must emphasize the fact that every woman who enters medicine has to face a certain amount of good or bad natured jeering.

Finally Mary graduates, and now she finds that a good many hospitals discriminate entirely against women as interns. Others accept one, or at the outside, two, and plead lack of residence accommodation as their reason for not taking on a fair proportion of women on the intern staff.

Having completed such period of post graduate training as she can obtain or is able to afford, our woman doctor starts off in practice. Here she encounters, though probably not to the extent which she has always been led to expect, the antipathy of the public toward women practitioners.

The gist of the whole story is that at every stage in her medical career and in whatever field she chooses to practise, a woman encounters, to greater or less degree, more opposition than her brother does. Because of this it is necessary for her to have a greater desire to follow this chosen profession, more strength of purpose, tenacity, determination, stubbornness, if you prefer, to achieve the same degree of success as is required of a man. Following this argument to its logical conclusion, it is my contention that every woman who graduates in medicine and carries on in any branch of this great profession, is superior to the average man who does the same by just that degree of increased endeavour it has required for her to overcome these

man-made obstacles. A woman must be more outstanding than her brother to attain the same degree of recognition. Consequently, in the long run she will excel him in the quality of her work.

It has been said of women in medicine that the vast majority of them do not have the same serious attitude toward the profession that most men have. Every man who enters medicine does so with the intention of making it his life work. There is no thought in his mind other than that he will eat, sleep and breathe medicine from his early student days until the fateful day he leaves this, Vale of Tears. It will be his livelihood his career, the mainstay of his being. Other experiences which may befall him, even such momentous ones as marriage and the production of a family, will be only satellites in comparison with this lode star of his existence-being a doctor. On the other hand, it is said that many women enter medicine purely for the purpose of being "different". Most of them have not the remotest notion of the sort of life most doctors lead, of the sacrifices entailed or the demands they will be expected to meet. All of them have at the back of their minds the secret knowledge that in all likelihood they will marry anyway, and therefore will never have to earn their bread and butter by the practice of medicine, and that it will probably be no more to them eventually than an interesting hobby. Consequently, their whole attitude throughout their short medical careers lacks a certain practical discernment and common sense that most men display. Women are said to have the sort of mind which is obsessed by details and their vision is so obscured by the little petty matters of routine that they cannot see the forest for the trees and frequently fail to recognize the significant fundamentals of the patient's condition.

There are several replies we can make to these indictments. Firstly, anyone who thinks twice about the matter will realize that any girl who begins medicine on the superficial motivation of a desire to be "different" will not last long under the ardours of the present curriculum and severity of marking. She must

either rapidly develop a more serious interest or drop out very early in the game. As for our being slaves to detail, someone has said that genius is just an infinite capacity for taking pains. And in any event, the ability to pay meticulous attention to the small routine matters is certainly a gift which carries anyone a long way in many fields and particularly in research work.

Now as to the matter of women medical students having the second string of marriage to their bows, we are on less sure ground and must proceed more slowly. It cannot be denied that being a good husband and father is much less of a handicap and distraction to the professional man than being a good wife and mother is to the professional woman. Convention demands that a wife not only live under the same roof with her husband, but also that she act as hostess at his board and at least supervise the running of his home and the care of their children.

It is obvious that marriage in itself is quite an adequate career for any woman, and for 90% of women the only career worth while. On the other hand to make a success of any profession requires the undivided attention and energies of most individuals. Therefore, to do justice to two careers, that of marriage and that of medicine, a woman must be a most exceptional person indeed. Here, of course, is the final and biggest stumbling block in the way of women essaying to be doctors. This is what is keeping and always will keep our numbers down. The optimists among us who foresee a rosy future for women in medicine in which men doctors will be as rare as male nurses now are, are merely blinding themselves to the glaringly obvious social, psychological and physiological handicap of women.

But there are exceptional ones among us who actually are capable of doing two jobs well and who are demonstrating it. And there are others among us whose hearts are dead in the grave of some blighted young romance. Still others have set their standards so high that they are quite unable to capture the supermen who alone would measure up to their rigid requirements. Then

too, there is that unnatural creature, the woman who prefers the engrossing interest, social freedom and financial independence of a medical career, to the domination of and dependence on any man no matter how attractive he may be. These women alone have any place in medicine. But of them I say there is no limit to the place they have, can and are making for themselves in the medical profession.

Men have monopolized the entire field of medicine for so many generations that it will take decades to re-educate the public and make it fully aware of women's talents and abilities in the same fields. This re-education is further slowed by the preponderance of men in medicine which, for reasons previously cited, I do not believe will radically change in the future. But the very fact that women comprise ten per cent. of the medical profession, whereas fifty per cent. of the general populace is women, enlarges our opportunities. And when the masses have been educated to recognize the equality of men and women medicos, then indeed the greater opportunity which our very numerical inferiority gives us, will achieve its full scope.

The other day a friend of mine, a fellow surgeon-in-training, admitted in a moment of confidence that though he might personally like and even admire individual women doctors, he never saw one of us without instinctively feeling that we had no business in medicine. Of course, he is right. The dice are heavily loaded against us and it is obvious to anyone that generally speaking women are better off to marry or choose some less arduous profession, or both. But there will never be any great surge of women into medicine. Marriage at an earlier age than is compatible with a medical education will always be more attractive to the vast majority of girls. So there is nothing to fear from the few of us who are really serious enough about it to carry through with it.

Our place in medicine will always be influenced to some degree by our brains, ability and the extent of our physical strength in individual cases. But beyond this we acknowledge no limitations. If she has the ingredients required for the job, a woman can excel in any field of medicine she chooses, and we are proving it.

Euthanasia—"a treatment for Rabies"

"The following Accident happened lately at Bedford. About six Weeks ago, one Mr. Thomas Field, of the Bury Farm in that Town, and one Brownfell a Labourer, were both bit by a mad Dog; they went directly to Boston in Lincolnshire, and were dipped in the salt Water there; Mr. Field had a large wound where the Dog bit him, which kept open, and discharged the Venomous Infection; but Brownfell's bite healed up, and he was to all Appearance well, but on the Friday about this time, he was taken ill, and on Saturday was raving mad, barking and howling like a Dog, and biting at every Thing in his Way; he had Intervals that he was fenfible, when he desired to be tied down to the Bed to prevent his doing Misfchief, and begged not to be fmothered, as People are in his unhappy Cafe, but desired to be bled to Death; accordingly on Saturday Night he had a Vein opened by a Surgeon of that Place, and bled till Sunday morning, when he expired in that miferable condition.

The London Magazine

and

Monthly Chronologer

1738

London. Printed for T. Astley, at the Rose over-
against the North-Door of St. Paul's.

Abstracts

R. L. MacMILLAN, Editor

Contributors { W. E. Armour
Ronald Nash
D. P. Bryce
D. J. Breithaupt
G. E. Walker

FORWARD: These abstracts are not intended to act as a summary so that the reader will not have to read the original article. Rather they are intended to draw the attention of the reader to articles of interest in current literature. It is the aim of the reviewer to sketch briefly what may be found in the paper and to evaluate it, as far as possible, as to the merit it possesses for the medical student, who will look up the paper and read it.

AN ADHESIVE STRAPPING FOR SPRAIN OF THE ANKLE

W. I. GALLAND

Journ. of Bone and Joint Surg., Jan. 1940

The principle of this method is to lock the ankle and subastragaloid joints by means of interlocking strips of adhesive. Essentially the strips are laid on in two directions:—

- (1) vertically around the heel and up the calf;
- (2) horizontally along the side of the foot.

The details of the method are simple and can readily be learned by consulting the article.

A patient, who is unable to walk with a badly sprained ankle, when strapped in this manner, can walk out of your office with no discomfort.

R. L. M.

IRON METABOLISM AND ITS RELATION TO ANAEMIA AND THERAPY

W. M. FOWLER and A. P. BARR
Ann. of Int. Med., Sept. 1940

The results of the treatment of anaemia with iron have improved in recent years, since the nature of the iron-deficiency anaemias has become better known.

The article briefly reviews the iron requirements and absorption from the gastro-intestinal tract. The latter is in-

efficient in patients with achlorhydria; and iron must be in the ferrous state to be absorbed. Much of the iron administered is passed in the faeces.

Reference is made to the kinds of iron-deficiency anaemia encountered. They are characteristically hypochromic and microcytic, with low colour and volume indices. Important ones are those occurring in pregnancy and infancy. The nutritional kind in adults is not usually severe unless accompanied by achlorhydria.

Of the iron absorbed not all is used at once to make haemoglobin; the excess is stored in the reticulo-endothelial system. The extra amount, however, seems to act as a catalyst, as haemoglobin is formed faster when it is present.

The article indicates that slightly better results were obtained with iron and ammonium citrate than with the sulphate or the carbonate. The usual dose is six grams a day, although good results were obtained with one gram.

W. E. A.

TREATMENT OF MIXED TUMOURS OF THE PAROTID GLAND

D. H. PATEY
Brit. Journ. of Surg., July 1940

The histology has been the chief concern of men who have investigated this interesting tumour. It is not generally realized that the treatment is unsatisfactory.

Before discussing treatment the course

untreated should be considered. It is a slow growing tumour that increases at variable rates in different patients. On the average, it may be said to reach the size of a walnut in 10 years and that of an orange in 20 years. Spontaneous malignant change in the untouched tumour is very rare. After operation the patient may be cured at the increased risk of being killed by it.

There are two problems connected with this tumour. The first is anatomical—the intimate relation with the facial nerve. the second is pathological—the tumour, even though it appears to be, is not encapsulated entirely.

There are three methods of treatment.

(1) Expectant:—this is applicable to old people who will probably die from another cause before the tumour is large enough to cause concern. In any case there should be no hurry to operate but the tumour should be watched for a while to see how fast it is growing, this will determine which way it should be treated.

(2) Radical surgical:—the tumour and capsule are removed with necessary damage to facial nerve.

(3) Enucleation of tumour with irradiation of seedlings.

Irradiation alone is not much good, however, with less extensive surgery (enucleation) post-operative radiation is valuable. Pre-operative radiation by thickening of capsule renders enucleation easier.

R. L. M.

COLLES' FRACTURE

J. H. MAYER

Brit. Journ. of Surg., April 1940

Unsatisfactory results are obtained rather commonly in adults suffering from this fracture. Despite apparently good reduction, when the plaster is removed, the deformity recurs. This is very unsightly and is of considerable embarrassment to the surgeon. The author suggests that the most important deformity in Colles' fracture is supination of the

distal fragment. This is neglected when the usual cast is applied that only extends up to and not including the elbow. To correct the supination the forearm must be fixed in the position of pronation with the cast running to the middle of the arm. He proves his contention of supination of the lower fragment by artificial Colles' fractures produced on cadavers. He compares in the paper the results obtained by treating the fracture by this method and the usual method.

R. L. M.

A PLEA FOR A MORE LOCAL OPERATION IN REALLY EARLY BREAST CARCINOMA

D. C. L. FITZWILLIAMS

B. M. J., Sept. 28, 1940

It is believed that cancer starts from one cell taking on a malignant change. It is months before the multiplication of the cells creates a mass large enough to be visible. It is logical that early a local operation will eradicate the disease.

The author defines an early carcinoma as a faintly perceptible something in the breast. Transillumination is a valuable method of diagnosis. Cases with beginning dimpling of skin and doubtful glands in the axilla are not suitable for local operation.

Notes on 93 cases are given and the author shows that local operation can confer the same amount of safety as a more radical procedure.

R. L. M.

TREATMENT OF GONORRHOEA WITH SULFATHIAZOLE

ORMAND CULP

Journ. of Urol., Sept. 1940

This is the latest sulfonamide compound used in treating gonorrhoea.

A series of 38 cases of gonorrhoeal urethritis were treated with this drug. 21 of these were followed and 17 had no recurrence. Two of the improved cases had failed on sulfonilamide.

Only two instances of toxicity were noted although daily blood and urine studies were done.

The best results were obtained with those patients who received one gram of sulfathiazole every six hours until voided urine was shredless. The blood level should be approximately 2.5-3.5 mgm.%—a higher level does not seem to be necessary.

The author does not think that the series is large enough to draw definite conclusions about the drug but he believes that it compares favourably with other sulfonamide drugs in the treatment of gonorrhoea.

R. N.

CRANIAL AND INTRACRANIAL COMPLICATIONS OF ACUTE FRONTAL SINUSITIS

P. C. BUCY and W. T. HAVERFIELD

J.A.M.A., Sept. 21, 1940

Acute frontal sinusitis is a fulminating, rapidly spreading infection, usually acquired as a result of swimming in infected water; and is marked by local pain, tenderness and fever. Its universal distribution should make it of interest to all.

Three cases of acute frontal sinusitis are reviewed along with their cranial and intra-cranial complications, and their treatment. Such complications are osteomyelitis of the frontal bone marked by edema of the forehead extending from the supraorbital ridge, and frontal lobe brain abscess of either side.

It is concluded that:—

(1) The infection spreads from the sinus in the main, by way of the frontal and anterior temporal diploic veins which further communicate with the longitudinal sinus via the emissary veins.

(2) Prompt external surgical drainage in acute fulminating cases is the best method of preventing the spread of infection.

(3) Osteomyelitis of the skull is best treated by excision of all infected bone.

(4) Brain abscess should, if possible, be drained through an uninfected area of skull, to prevent meningeal infection.

D. P. B.

TOPOGRAPHICAL STUDIES OF DISTURBANCES OF SWEAT SECRETION AFTER COMPLETE LESIONS OF PERIPHERAL NERVES

L. SUTTMANN

Journ. of Neur. and Psych., July 1940

This is a work demonstrating the practical application of sweat secretion studies from the physiological and diagnostic point of view. An indicator is used which turns blue when moistened with perspiration.

Three different zones of peripheral nerve supply may be mapped:—

(1) The autonomous zone is the area in which loss of sensation and sweating are complete following blockage of its nerve of supply.

(2) The intermediate zone is the area of incomplete loss of sensation and hypohydrosis, which is supplied by the blocked nerve and also nerves adjacent to it.

(3) The maximal zone is the sum of the above two areas and which can only be demonstrated when all other nerves to the part are blocked.

Experimental work is done on the axillary, radial, median, ulnar, common peroneal, and supraorbital nerves. The results are recorded and illustrated. A great variability of autonomous supply and overlay of adjacent peripheral nerves is demonstrated.

D. P. B.

ACUTE HEMOLYTIC ANEMIA (ACQUIRED HEMOLYTIC ICTERUS, ACUTE TYPE)

WM. DAMEAHEK, M.D., and
STEVEN O. SCHWARTZ, M.D.

Medicine, 19: 231, May 1940

This is an interesting eighty page monograph on the acute type of acquired

hemolytic jaundice, the authors having carefully reviewed the literature which first began to appear about 1900. Of 106 cases reported in the literature, transfusions were given in 66. In 22 of this group transfusions were unsuccessful in arresting the disease. Splenectomy was curative in 20 of 23 cases in which it was carried out. By May, 1940, the authors had seen 11 cases of acute hemolytic anemia. One responded to transfusions. Of the remaining ten, five recovered completely after splenectomy (in one removal of a large dermoid cyst of the ovary was done after a relapse) and 5 died, 4 operatively, and one due to a relapse after operation.

The authors consider spherocytosis and increased fragility to be due to a hemolysin acting in the blood stream on normal adult red blood cells, and not to a bone marrow dyscrasia. The bone marrow they found to contain normal sized normoblasts. They were able to show serum isolysins in 2 cases, and to reproduce the condition in animals by injecting hemolytic agents such as distilled water, phenylhydrazine, and more particularly, rabbit's serum immunized against guinea pig red blood cells, into guinea pigs. By varying the dosage of hemolytic agent they produced experimental syndromes varying from a fulminating hemolytic anemia with hemoglobinuria with a large dose, through a spherocytosis and reticulocytosis stage, to a subacute hemolytic anemia with pseudomacrocytosis with small doses. Corresponding to these conditions, they consider acute paroxysmal hemoglobinuria, and fulminating acute hemolytic anemia with hemoglobinuria, to be due to a large dose of lysis. Acute hemolytic anemia (also known as 'Lederer's' or 'febrile' anemia) with spherocytosis or reticulocytosis predominating, and crises of chronic hemolytic anemia to be due to a moderate dosage of the lysis. A smaller dose of the lysis is thought to correspond to subacute hemolytic anemia with pseudomacrocytic blood picture. There are at least 4 known different types of lysis which may be responsible for the hemolysis, spherocytosis, and increased fragility. One of these is that found by Donath and

Landsteiner, a hemolysin activated in the cold and then functioning at room temperature in cases of paroxysmal hemoglobinuria.

It is pointed out that the macrocytes in acute hemolytic anemia are mostly polychromatophylic, (reticulocytes) while those in pernicious anemia are orthochromatic. Other differences from pernicious anemia are the lack of response to liver which is absolutely ineffectual in this condition, and the absence of any nervous or tongue signs. A large number of normoblasts, in the absence of megaloblasts with a pernicious anemia-like picture should lead to the suspicion of acute hemolytic anemia.

They often consider the treatment of acute hemolytic anemia to be urgent. If, after three to four transfusions (which must be of the same group, and tested for hemolysis of the donor cells by the recipient serum, by incubating them for an hour) there is not continued improvement, splenectomy should be considered as an emergency measure. Although this may be a very severe strain on the patient, the alternative is almost surely fatal. The response after splenectomy is an almost immediate rise in the number of red blood cells, and the gradual resumption of a normal blood picture. This may be due to the removal of the source of lysins, or the organ of destruction of the red blood cells. Transfusions may act by means of the antihemolytic effect of normal serum, in which case concentrated serum should prove to be useful.

The following classification of the conditions is offered.

- A. Congenital hemolytic icterus (anemia)
 1. Chronic, with or without crisis
 2. Subacute
 3. Acute (crisis)
- B. Acquired hemolytic icterus anemia)
 1. Secondary to known cause—
 - infectious
 - chemical
 - "toxic"
 - pregnancy, etc.

2. Symptomatic, in association with certain, usually malignant diseases such as
 - lymphatic leukemia
 - Hodgkin's disease
 - carcinomatosis
 3. Of unknown cause, with or without hemolysins in the serum
 - a. Chronic, with or without crisis
 - b. Subacute
 - c. Acute
 - d. Acute fulminating, often with hemoglobinuria.
- D. J. B.

THE PREVENTION OF STREPTOCOCCAL INFECTION OF WOUNDS

RONALD HARE, M.D. (LOND.)

Canadian Public Health Journal, 31: 407
Sept. 1940

From the Connaught Laboratories, and the School of Hygiene, University of Toronto.

The streptococci which are of importance in wounds are almost always haemolytic streptococci or *Str. pyogenes*, the *viridans* and non-haemolytic group being for all practical purposes negligible. In the last war, the wounds infected with haemolytic streptococci were found to be 15% at the casualty clearing stations, 23% in a base hospital, and 90% in an investigation of cases of compound fractures of the femur.

The work of Lancefield in separating the pathogenic group A from those of the other groups B to M which are not pathogenic to man, has made possible an investigation into the possible source of the wound infection. This is given in a very readable fashion. Dr. Hare concluding that such infection is from one of two sources, either the nasopharynx of normal or slightly ill carriers (7% of normal persons carry pathogenic strains of haemolytic streptococci in their throat), or infected material coming from suppurating

wounds, cellulitis, impetigo, otitis media and other similar purulent exudates in the vicinity of the open wound.

As control measures, it is advised that the attendant wear a mask and gloves when dressing the wound, that he refrain from talking, and that infected cases be strictly isolated from "clean" ward cases. A minimum of dressing of the wound, and prophylactic sulphanilamide are suggested.

D. J. B.

A METHOD OF FIXATION FOR FRACTURE OF THE CLAVICLE

GORDON MURRAY

Journ. Bone and Joint Surg., July 1940

The present cosmetic and anatomic results of treatment of fracture of the clavicle are not satisfactory. This article describes an effort made to improve the treatment.

The anatomy of the clavicle was investigated and it was found that the cortical shell was thickest at the middle third and it remained a strong cylinder except for the medial half inch and the lateral inch. The interior was light cancellous bone with lamellae running longitudinally and obliquely.

During many trials with cadavers, when a wire was passed through the thin cortex at either end and directed toward the central part, it was guided by the funnel-shaped end into the central cylinder. On reaching this it stayed within the cortical shell and followed the curves until it reached some point fairly near the opposite end.

Subsequently it was shown that the thinnest wire that could be passed gave adequate fixation and that there was little if any lateral stress on the wire at the fracture site.

The method of introducing the wire may be read in the paper. Afterwards no other fixation except a sling is required.

G. E. W.

TREATMENT OF MEGACOLON WITH ACETYLBETAMETHYL- CHOLINE BROMIDE

JOHN L. LAW, M.D., Ann Arbor

American Journal of Diseases of Children
60: 262, Aug. 1940

The author starts with a consideration of the physiology of the state of megacolon, and the nervous control of the colon. The disadvantages of lumbar sympathectomy are seen to be that the operation is poorly tolerated under 4 years of age, those with marked colonic dilatation and thin, weak musculature are not apt to react successfully, and there is no diagnostic test on which to prognosticate successfully.

Acetylcholine proved to be too unstable and have too many side actions of a toxic nature, to be useful. Also it was not effective orally. However, the hydrobromide or hydrochloride of acetylbetamethylcholine has proven to be effective by mouth in doses of 0.1 to 0.2 grams given one-half hour after breakfast, and again in the afternoon if necessary. The importance of habit formation augmented by the drug is emphasized in the establishment of normal colonic activity. A routine of about 5 days duration is tested before doses are altered. The drug is

used in conjunction with liquid paraffin by mouth, and enemas. When the habits are well established the enemas, then the drug are discontinued, and in successful cases even the oil can finally be omitted. The oil is given in one to two drachm doses at h.s. Prostigmine bromide was used to augment the activity of the acetylbetamethylcholine bromide in some cases, with no conclusions obtainable as to its usefulness.

The histories of fifteen typical cases are reported. In three of these satisfactory initial drug therapy was abandoned in favour of sympathectomy, in four, subcutaneous injections for brief periods had little beneficial effect, in two obstinate relapse after sympathectomy was relieved by drug therapy, and in six the condition was successfully managed by medical therapy, including acetylbetamethylcholine. Several of the cases died of acute obstruction due to kinking of the engorged bowel. In one this was associated with bromide idiosyncrasy, and in another case caecostomy provided effective relief.

It would seem that the drug acetylbetamethylcholine hydrobromide has a very real place in the medical treatment of megacolon, along with other measures such as oil and enemas, and the establishment of a new bowel habit.

D. J. B.

Book Review

The 1939 Year Book of General Medicine. Edited by George F. Dick and others. Published by The Year Book Publishing Co., 304 S. Dearborn St., Chicago, 1940. 848 pages. \$3.00.

THIS edition of the YEAR BOOK maintains the high standard of previous volumes whose usefulness as a convenient and up-to-the minute reference on a wealth of subjects needs little emphasis. Once again the best of the year's medical literature has been brought together in condensed

form after careful searching and consideration. Its purpose is to bring up to date the story of the past year's advances in general practice. The medical profession at large owes the editors a debt of gratitude for this continuous record of progress in the various branches of medical science. It is a pleasure to pick up this book and browse through its pages from subject to subject with the knowledge that one is thereby keeping abreast with current developments from an authoritative source.

F. O. Wishart

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